(MAIN HOSPITAL.)

CONNECTICUT HOSPITAL FOR INSANE.

AT MIDDLETOWN.

MIDDLE HOSPITAL.

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SOUTH HOSPITAL.

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TWENTY-FIFTH REPORT

OF THE

BOARD OF TRUSTEES

OF THE

Connecticut Hospital for the Insane

OF THE

STATE OF CONNECTICUT,

WITH THE

SUPERINTENDENT'S AND TREASURER'S REPORTS,

FOR THE

Biennial Period Ending June 30th, 1894.

Presented to the General Assembly at its Session in January, 1895.

BY ORDER OF THE GENERAL ASSEMBLY.

MIDDLETOWN, CONN.:
PELTON & KING, PRINTERS AND BOOKBINDERS.
1894.

Officers of the Hospital.

BOARD OF TRUSTEES.

THE GOVERNOR OF CONNECTICUT.

HENRY WOODWARD,	Middlesex County,	Middletown.
WILLIAM BISSELL, M. D.,	Litchfield County,	Lakeville.
AUSTIN E. MAY, M. D.,	Fairfield County,	Bridgeport.
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ELIJAH K. HUBBARD,		Middletown.
FRANK B. WEEKS,		Middletown.

M. B. Copeland, - - - - - - - - - - *Treasurer.*

RESIDENT OFFICERS.

JAMES OLMSTEAD, M. D.,	*Superintendent and Physician.*
HENRY S. NOBLE, M. D.,	*Assistant Physicians.*
WILLIAM E. FISHER, M. D.,	
CHARLES E. STANLEY, M. D.,	
JAMES M. KENISTON, M. D.,	
A. B. COLEBURN, M. D.,	
L. PIERCE CLARK, M. D.,	
JESSIE M. WESTON, M. D.,	
THOMAS M. DURFEE,	*Clerk.*
P. W. SANDERSON,	*Farmer.*
MRS. MARGARET DUTTON,	*Matron.*

All communications relative to the admission, etc., of patients, should be addressed to the Superintendent. Blanks will be furnished on application.

TRUSTEES' REPORT.

To the Honorable the General Assembly
of the State of Connecticut:

The Trustees of the Connecticut Hospital for the Insane respectfully submit their twenty-fifth report, together with the reports of the Superintendent and Treasurer, covering the period from July 1, 1892, to June 30, 1894, inclusive.

In presenting this report, the Trustees deem it a matter for congratulation that they have never had occasion, in consequence of serious errors or complaints, to make to your honorable body, or to the public, an apology, explanation or defence of the management of the institution. It has ever been open to the inspection of all properly authorized persons, and all having special reasons for inquiry have received particular attention. Careful oversight has been exercised by the Trustees, and in their unannounced visits they have received the cordial coöperation of the officers, who have always appeared as though conscious that they were doing their duty, having nothing to conceal or to dread from the most searching examination. The Hospital still maintains its high character; whatever improvements study or experience have developed have been adopted, and its officers have not been behind others in devising means for the better care and improvement of the unfortunate class over whom they have oversight.

It is not necessary to urge that skillful medical treatment, proper food, and care as to regularity of habits, are not all that should be expected of a hospital. Great and in many cases equal benefit may be derived from judicious employment, varied amusements and pleasant surroundings, such as well arranged grounds, ornamented with trees, shrubs, and flowers.

Influences derived from these sources powerfully tend to divert the attention of the insane, to correct the morbid action of their faculties and give a healthy tone to the activities of their bodily and mental powers. One result in this institution has been the lessening of restraint till only a very few inmates, and for very special reasons, are subjected to it.

The number of patients present at the end of the period was 1580, more than a hundred in excess of the number for whose accommodation provision has been made. Applicants for the admission of patients are obliged to wait several weeks for vacancies. Under these circumstances it is especially regretted by the Trustees that valuable space needed by innocent persons should under the mandate of the law be occupied by convicts. The hope, expressed in a previous report, is still entertained that suitable quarters for insane convicts may be constructed at the State Prison and that Section 3617, General Statutes, directing their transfer to this Hospital, may be repealed.

Since, notwithstanding the advice of the Trustees, it was decided to further enlarge this institution, the State is to be congratulated on acquiring possession of land well adapted for the location of buildings. The report of the building committee, presented herewith, contains interesting intelligence of the progress of the work, whose completion will at least partially relieve almshouses of insane inmates.

Twenty-five years having passed since the Hospital was opened, it has seemed fitting that some memoranda of its history should be collated and published as an appendix to these reports for the information of your honorable body; this has accordingly been done.

It is gratifying to call attention to the fact that, favored by low prices of various necessaries of life, a further reduction has been possible in the price of taking care of the insane poor, which since April 1, 1893, has been at the rate of only $2.80 per week.

The Trustees have had occasion to mourn the loss by death of two of their number—the Hon. Benjamin Douglas, who was a member of the Board almost from the outset and, while his health permitted, was second to none in devotion to the welfare of the insane and to whatever concerned the interests of the Hospital; Mr. John N. Camp, whose active mind and unusual qualifications in practical business affairs made him a valuable member of the Finance Committee.

In the places of these members Mr. Horace F. Boardman and Mr. Frank B. Weeks were appointed.

The official terms of the following named Trustees will expire July 1, 1895: Henry Woodward, Middlesex County; William Bissell, Litchfield County; Austin E. May, Fairfield County; Andrew C. Smith, New Haven County; Samuel Russell and Horace F. Boardman, "from the vicinity of the institution."

Respectfully submitted,

Luzon B. Morris,
Henry Woodward,
William Bissell, M. D.,
Austin E. May, M. D.,
Andrew C. Smith,
Wm. D. Morgan, M. D.,
Costello Lippitt,
George H. Nichols,
Wilbur B. Foster,
Samuel Russell,
Horace F. Boardman,
Elijah K. Hubbard,
Frank B. Weeks.

Building Committee's Report.

To the General Assembly of Connecticut:

The Legislature of 1893 having decided to provide additional accommodations for the insane, the following resolution was passed:

Senate Joint Resolution No. 351.

APPROPRIATION FOR THE CONNECTICUT HOSPITAL FOR THE INSANE.

Resolved by this Assembly: Section 1. That a Building Committee of five members, three of whom shall be elected by the Trustees of the Connecticut Hospital for the Insane, and two of whom shall be elected by the Senate, be and are hereby authorized and directed to cause the erection in the Town of Middletown, of a suitable building sufficient for the accommodation of two hundred and fifty insane persons of the class known as incurable insane.

Sec. 2. Said Committee is hereby authorized and directed to expend for said purpose such a sum of the moneys now held by said Trustees of said Hospital, not to exceed seventy thousand dollars, as shall be necessary.

Sec. 3. A further sum of thirty thousand dollars, or so much thereof as shall be necessary, is hereby appropriated from the State Treasury, to furnish and complete said building.

Approved, June 30, 1893.

In compliance with this Act, the Senate having elected the Hon. Seth J. Hall, of Meriden, and Dr. Matthew T. Newton, of Suffield, the Board of Trustees appointed Mr. A. C. Smith, of New Haven, and Messrs. Samuel Russell and Henry Woodward, of Middletown, to complete the Committee.

This Committee organized by appointing Henry Woodward Chairman and Treasurer, and Samuel Russell Secretary.

There being no suitable site for locating the new buildings on the land owned by the State, a very desirable piece of land contiguous to the Hospital property, conveniently located and admirably adapted for the purpose, was purchased, upon which the buildings have been placed.

The buildings known as the South Hospital having proved very satisfactory to all the officers of the institution, your Committee requested several architects in this State to make plans and specifications for a building upon the same general plan of the one named, using every means to make the structure as nearly fire-proof as possible.

Several plans were presented and considered, but the estimated cost of all but the one furnished by Messrs. Curtis & Johnson, of Hartford, was found to exceed the amount appropriated by the General Assembly.

This plan, which called for a plain and substantial structure of brick, relieved by terra cotta ornaments, and of what is known as the slow-burning construction, was adopted.

After an examination of several systems for the purpose of heating and ventilating the buildings, your Committee decided to adopt that of the Sturtevant Company, of Boston, Mass.

Bids having been received, the contract for the building was awarded to Mr. H. B. Philbrick, of Hartford, and for heating and ventilating, to the New Haven Heating and Plumbing Company, of New Haven.

The buildings are now well advanced and will be ready for occupancy in the early spring.

Water was conveyed to the grounds from the Hospital reservoirs, the excavations for laying the pipes, as well as the grading and sewering being done by the inmates of the Hospital without expense to the State.

The cost of the buildings will be very nearly as follows:

Contract for mason and joiner work, slating, painting and plumbing,	$75,000 00
Land,	5,000 00
Heating and ventilating,	11,200 00
Surveying,	135 00
Water pipe and connections,	1,166 00
Architects and incidentals (estimated),	3,500 00
Total,	$96,001 00

This will leave a balance of about $4,000 to apply to furnishing the building, which falls below the estimate for that purpose, but your Committee are in hopes that arrangements can be made whereby the Legislature will not be called upon for any further appropriation.

SETH J. HALL,
MATTHEW T. NEWTON,
ANDREW C. SMITH,
SAMUEL RUSSELL,
HENRY WOODWARD,
} *Committee.*

NORTH HOSPITAL.

SUPERINTENDENT'S REPORT.

To the Board of Trustees of the
Connecticut Hospital for the Insane:

GENTLEMEN:—I beg leave to present for your consideration the following report of the condition of the Hospital during the two years from July 1, 1892, to June 30, 1894, inclusive, together with tables containing such information as your by-laws direct concerning the patients admitted and discharged.

The changes in the **census** of the patients during this biennial period are exhibited in condensed form thus:

	MEN.	WOMEN.	TOTAL.
Present July 1, 1892, - - - -	696	810	1,506
Admitted, - - - - - -	382	314	696
Discharged, - - - - - -	325	297	622
Present June 30, 1894, - - - -	753	827	1,580

It appears that there has been an increase of seventy-four in the total number under treatment, and as the Hospital was full to overflowing two years ago, the question may naturally be asked, how has it been possible to accommodate more? The answer is, that thirty-eight patients have been temporarily lodged in the old chapel in the center of the main building, by postponing for a time other uses for which that room is needed; and that thirty men have been accommodated in a comfortable farm house standing on land purchased for additional buildings, while a few extra beds have been crowded in here and there. The number admitted has been fully up to the limit of the Hospital's capacity, and during a large part of the time it has been impossible to receive patients without a delay of several weeks. It has,

therefore, been necessary to caution people generally to make application for the admission of patients before bringing them to the Hospital, applicants being admitted in regular turn as fast as the occurrence of vacancies permits.

The following table shows the methods of **commitment** which justify the detention in the Hospital of the patients present June 30, 1894:

1,413 committed as pauper or indigent persons by the Probate Courts.
14 committed as private patients.
27 committed by the Soldiers' Hospital Board.
6 committed by the County Commissioners.
42 committed by the Governor's order.
63 committed by the Superior Court.
15 committed by the Police Courts.

1,580 Total.

To the question how these patients are **supported,** the answer is that:

847 paupers are supported by towns and by the State.
566 indigents are supported by friends and by the State.
27 soldiers are supported by the State.
6 jail convicts are supported by the State.
41 Governor's commitments are supported by the State.
1 Governor's commitment are supported by the town and State.
14 private commitments are supported by private funds.
3 criminal court commitments are supported by private funds.
23 criminal court commitments are supported by towns and State.
52 criminal court commitments are supported by the State.

1,580 Total.

Commitments by the Governor now include convicts from the State Prison, convicts from the County Jails (heretofore committed only by the County Commissioners) and insane paupers not belonging to any town in this State. With the passage of Chapter 46, Public Acts, 1893, providing for the commitment by the Governor of convicts serving sentences in County Jails, it is surprising that the imperfect statute was not repealed which permits such persons to be sent from jails to the Hospital by the County Commissioners. In the latter case no medical certificate of the patient's insanity is filed at the Hospital, nor is there any authority for the patient's detention after the expiration of his sentence if he continues insane; and yet he may be so demented or so

dangerous that the safety of himself or of the public may be imperiled by setting him at liberty.

The **distribution** of the patients among the several buildings of the Hospital is exhibited in the following table, which also indicates how far in excess of the true capacity of the Hospital is the number under treatment in it:

	Capacity.	Patients.
Main Hospital,	470	548
Middle Hospital,	320	370
South Hospital,	340	340
Annex,	30	31
Main Cottage,	190	197
Farm Cottage,	20	20
Fallon Cottage,	20	21
Roberts Cottage,	20	23
Hubbard Cottage,	30	30
Total, June 30, 1894,	1,440	1,580

Evidently this system of detached buildings, the larger ones being subdivided into separate wards, must contribute very greatly to diminish the unfavorable influence of different types of insanity upon one another.

Even a cursory glance through the wards will impress the observer with the large preponderance of chronic over acute insanity. Formerly, in one of the tables annually printed, there was an attempt to estimate how many of the patients in the Hospital at the end of each year were likely to recover. But that table was discontinued long ago, so small was the number present at any given time whose **recovery** could be predicted as probable. According to the statistics appended, only 74 of all remaining in the Hospital have been insane less than one year, and 1,018 have been insane over five years; of all admitted during the last biennial period, 340 had already been insane longer than one year and 150 had been insane from five to thirty or more years when admitted. Taking into consideration other circumstances besides duration, barely one-third of 358 persons admitted last year were in such a condition as would justify expectation of recovery even in the most favorable environment.

When the present overcrowded state shall have been relieved by the completion of the building now in process of

construction, the wards of the Main Hospital, originally designed for the reception of acute cases, might be better fitted than now for successful treatment in various ways additional to the removal of chronic disturbers. For instance, the long, rather gloomy corridors, not calculated to dispel timid forebodings from the minds of new comers, might become far more attractive by projecting bays, as appear in buildings of later date. Infirmary wards or buildings, devoted exclusively to the care of patients so ill as to require special nursing, also might be beneficial; and a building need not be large to hold all these sick persons (were it best to group them), for the number confined to bed is surprisingly small in comparison with the total, as shown for each quarter of last year by the subjoined table:

Patients.		Male.	Female.	Total.
1893—July–Sept.	Average number present, -	715.08	825.79	1,540.87
	Average number sick in bed,	3.22	17.46	20.68
Oct.–Dec.	Average number present, -	716.68	822.88	1,539.57
	Average number sick in bed,	3.91	13.87	17.78
1894—Jan.–Mar.	Average number present, -	741.46	825.51	1,566.97
	Average number sick in bed,	6.13	11.49	17.62
Apr.–June.	Average number present, -	747.16	824.91	1,572.08
	Average number sick in bed,	6.37	11.82	18.19
During the year.	Average number present, -	730.09	824.77	1,554.87
	Average number sick in bed,	4.90	13.66	18.56

However, it should be remembered that these invalids, unlike those in a general hospital, are affected with such widely different forms of insanity that not all of the same sex could well be together. Tempting as might be the vine-screened piazzas, the cheerful fireplaces, the dainty diet, the trained nurses and the other equipments of an infirmary, the fastidious hypochondriac would protest against being near puerperal mania. Perhaps of more practical utility would be apartments for each sex, in which patients, brought from poorly kept almshouses and even less tidy tenements, might be stripped of their vermin-loaded clothing and be treated to the surprise of a Turkish bath before admission into the wards.

Under the title of **toxic insanity** (Table 11) are classified twelve persons, admitted during the biennial period, who

were insane only so far as addicted to the excessive use of certain drugs—alcohol, morphine, chloral. These having been eliminated, the patients were rational and were discharged not as recovered, for brief abstinence from habitual indulgence is not supposed to be curative, but as unimproved. Strangely enough, it is sometimes necessary to inform people that this is not an inebriate asylum.

The statistical tables also show that during the last two years five persons were admitted, who disclosed subsequently no evidences of insanity. After such detention as study of their cases and respect due to the committing authorities demanded, they were discharged as **not insane,** without intending thereby to reflect upon the judgment or sincerity of our professional brethren, who signed certificates of insanity.

Take for example the following case: A girl, 16 years of age, with a hereditary predisposition to insanity and an excitable temperament, after inhaling nitrous oxide gas, exhibited hysterical symptoms, appeared to have hallucinations of sight, was violent and threatened suicide. These phenomena alternated with occasional lucid intervals for several weeks, until reluctantly it was decided to remove her from home to the Hospital, and she was committed in due form. The result was that her power of self-control promptly reasserted itself, and after spending three weeks here without any indication of insanity, the patient was gladly welcomed home, certainly no worse for her visit.

Another patient not insane was a convict; and in respect to this class of persons the utmost precautions against error are unquestionably exercised. Yet this shrewd thief was not the first convict to interrupt the monotony of imprisonment by feigning insanity successfully. Two of them have been brought from the prison three times with histories of violent mania, never exhibited here. Reported to be sane, each one has twice been taken back to prison only to exemplify the truth of a well known writer's observation that "there are persons in these asylums, who rather try to suppress than to welcome symptoms of recovery, and when turned out they manœuvre to get in again."

Not merely does the existing statute tempt the malingerer, but it increases the risk of escapes. The rigorous discipline

and safeguards of a prison are not in harmony with the spirit of a hospital. No patients need exercise and occupation more than do these convicts, but no others are so watchful of the smallest loop-hole. Two of them, last year, while at work under apparently sufficient guard, managed to escape. Otherwise they would a little later have returned to prison, for their insanity—of that peculiarly transitory type—had vanished on the way hither.

Of all others who attempted to escape during the biennial period, only one is missing—a man who had been accustomed to help in the lawn work and had shown no disposition to harm himself or any one else. In such cases as this the misfortune of occasional escapes is believed to be overbalanced by the benefits of **occupation** or "industrial treatment," as some one has put it, and aptly, too, for the things that may engage an insane person's attention and may keep his hands out of mischief, are by no means beneath the notice of the physician, and when among several hundred cases of chronic insanity not a dozen are ailing, but many idle, surely it is strictly within the bounds of medical work to devise various methods of keeping as many patients as possible busy in healthful ways. It is well to remember that not every chronic case is incurable. Of 1,395 recoveries, it appears (Table 19) that 419 cases—nearly one-third—had been insane longer than a year, and that nearly fifty of them recovered after a duration of more than five years. For a year or two, in the winter days especially, an increasing amount of needle work has been done in the women's wards, and credit is due to the supervisors and attendants whose active coöperation contributed to good results. Statements of the amount and variety of work done in the sewing-rooms and the men's workshop are appended for the purpose of showing how some of the patients are employed. The word occupation, if used not merely in the sense of labor, but of whatever keeps one busy, embraces such diversions as games, reading circles, schoolroom exercises, and winter evening entertainments; the latter involving an expenditure justified only on account of the benefit derived from them by intelligent patients; and it is solely on this account that the medical staff lead in the preparation of these entertainments. As an element of treatment, also, the musical organizations—the band and the

orchestra—are kept up under the efficient direction of a member of the staff.

In the department of **gynaecology** it has become customary for the female patients soon after admission to meet a physician of their own sex whose duty is to ascertain about the existence of diseases peculiar to women. In about half of the number admitted during the two years under review there was either no probability of local disease or there were sufficient reasons to forbid examination. The majority of the 155 women examined suffered more or less from morbid conditions susceptible of at least partial benefit from treatment adopted. This work was done mostly by Dr. Mary Harley, whose service of eighteen months as interne extended from the conclusion of Dr. Sherman's term, December, 1892, to June, 1894, when Dr. Weston was engaged.

In the department of **pathology** it is gratifying to note more minute and systematic study than has been possible in years past. For, when the temporary absence of one and another of the assistant physicians made additional help necessary, a recruit was secured in the person of Dr. L. Pierce Clark, who was recommended by his instructors, and has shown ability to do creditable work in this branch of medical science.

Looking over the record of **deaths** during the biennial period, it appears (Table 23) that only two of them were due to causes of such a nature as to call for special mention. One was a case of diphtheria, which developed a week after the patient's admission. There had been no diphtheria in the house for a long time previously, and no other deaths from this cause followed. The other case was that of a man, who had been in the Hospital three years, and lost his life by rashly trying to escape at night from an upper window. The improvised rope of bed coverings parted and the patient, falling to the ground, sustained injuries from which death resulted within six hours. Nearly a fifth of all who died since the opening of the Hospital had passed the age of three-score and ten years, and more than a third of them (Table 24) had been deprived of reason from five to fifty years, waiting for "life's tedious nothing" to be ended.

The list of major **improvements** made under your direction represents fairly the variety of mechanical work which,

in addition to numerous minor repairs, must be provided for in each year's estimate of expenses.

First in point of time is to be noted an ice house, located beside one of the reservoirs, capacity 1,200 gross tons, like the one already standing near the other buildings, the intent being to gather a double crop whenever practicable, in order to prepare for the contingency of a mild winter. Such was the next winter after the new house was filled.

2. An additional piggery, well lighted and ventilated, containing seventeen pens—each one usually the nursery of a little family—was built on a stone foundation with brick walls from the ground to three feet above the floor, wooden superstructure and slate roof. The floor is easily kept clean, all refuse matter dropping through trap doors into the cellar.

3. The system of sewage disposal by surface irrigation was extended by laying 3,300 feet of six-inch cast-iron pipe across Butler's Creek and up to the top of the ridge, on either side of which the cultivated part of the farm is located. The effect was not only to increase the quantity of produce by enriching the soil, but, by watering it, vegetation was saved from destruction during a drought.

4. In the main building the original inflammable partition walls of six elevator wells were replaced by brick carried up through the roof, and a seventh elevator well was abolished by uniting the dining-rooms on each floor. The brick walls of two dust chutes terminating in the attic were also continued through the roof, in order to lessen fire risks.

5. A frame cottage, containing eight bedrooms, was erected in a retired part of the grounds to provide suitable sleeping quarters for persons on night duty. The rooms on the wards which they vacated were filled by patients.

6. The workshop in the Annex being no longer large enough, a one-story shop of brick with slate roof was built close by. Its floor space (70x20 feet) is no more than is needed for the variety of work carried on.

7. In the corridors of two wards, where plaster had begun to fall and was considered unsafe, metal ceilings were applied.

8. A flag-stone walk, four feet wide, was laid around the north end of the main building, connecting the walks in

front and rear, and enabling walking parties of patients to make a complete circuit of the grounds dry-shod.

9. The farm of about fifty-two acres, purchased from the heirs of the late Elisha S. Hubbard, opens the way to further improvements, for it extends from the northern boundary of the Hospital grounds across the Valley Railway to the Connecticut River; and it is apparent that some sort of railway connection with the coal bunkers and storehouses is needed more and more every year. A considerable portion of this farm is a desirable addition to the tillable land belonging to the Hospital, and a portion not cultivated, when cleared of underbrush, can be made most attractive to walking parties. The large substantial farm house on the premises—one of the landmarks of this region—has been repaired, supplied with water and steam heat and furnished for thirty patients. By this purchase an admirable site was obtained for building additional accommodations for patients as required by an act of the last General Assembly. A front view and first floor plan of the structure contracted for were prepared under the direction of the architects, Messrs. Curtis & Johnson, of Hartford, to accompany similar illustrations of the three other principal buildings, all the floor plans being reduced to a uniform scale to facilitate comparisons.

The **financial condition** of the Hospital is exhibited in the statements appended in connection with the Treasurer's report. The balance on hand has been very considerably reduced by the purchase of the Hubbard property and by the payment of seventy thousand dollars to the committee elected to erect further accommodations. The price of board for beneficiaries was reduced in April, 1893, to the low rate of $2.80 weekly. Nevertheless it has thus far been possible, without lowering the standard of care, to keep the expenses of maintenance within the revenue.

The Farmer's report of the quantity and estimated value of farm products is appended. With plenty of men ready to labor simply for the sake of exercise, with large quantities of fertilizing material to be disposed of, and with a demand at home for all the crops that can be raised, the utility of the Hospital's farm would seem to be unquestionable.

In acknowledging **favors** received, it is fitting first of all to thank the clergymen of the vicinity who have cheerfully responded to our call and whose ministrations, both public and private, have been gratefully appreciated by many patients. For the pleasure experienced at secular gatherings during the past two winters the patients are indebted to various friends, as shown by the following list of entertainments:

MUSICAL AND DRAMATIC.

"Esmeralda," by students of Wesleyan University.
Entertainment by the "Bee Society."
Concert by Misses St. John, Mack and Sherman.
Concert by Mr. Ericsson F. Bushnell, supported by the Hospital Orchestra.
Concert by the St. John's Church Choir.
By the Hospital Company, plays three evenings, varieties two evenings, concerts two evenings.

LECTURES.

By Mr. George L. Chase, "The Sandwich Islands."
By B. G. Northrop, LL. D., "The New Era in Japan."
By B. G. Northrop, LL. D., "Village Improvement."
By Mr. Ernest King, "Waterloo."
By Mr. Ernest King, "Popular Delusions."
By Dr. Keniston, "Mozart."
By Dr. Keniston, "Handel and Haydn."
By Dr. Keniston, "Beethoven."

LECTURES ILLUSTRATED BY THE STEREOPTICON.

By Rev. P. M. Snyder, "Switzerland."
By Mr. W. R. Morgan, "St. Peter's and the Vatican."
By Mr. H. C. Whittlesey, "Japan and the Japanese."
By Mr. K. H. Kazanjian, "Syria."
By Prof. E. T. Merrill, "Stories of Ancient Rome."
By Mr. Frederick L. Chapin, "The Cliff Dwellers."
By Prof. H. E. Northrop, "Italy."
By Prof. H. E. Northrop, "Germany."
By Prof. H. E. Northrop, "Ireland."
By Mr. Frank G. Jester, "The Columbian Exposition."
By Dr. Noble, "Shakespeare."
By Dr. Noble, "England."
By Dr. Stanley, "Washington."
By Dr. Coleburn, "Ireland."

READINGS.

By Prof. R. G. Hibbard; by Miss Lizzie D. Lyman; by Miss Gertrude Grier; by Miss Elizabeth A. Pickering; by Miss Adele Weber (two evenings).

MISCELLANEOUS.

Exhibition of clay modeling by Mr. E. S. Woods.
Crayon sketches by Mr. George E. Little.
Ventriloquism by Mr. H. T. Bryant, two evenings.
Dancing parties, twenty-five evenings.

The Hospital is under obligations to the family of Mr. John N. Camp for a portrait which keeps memories of him fresh in mind. Mr. E. K. Hubbard presented a large number of pictures to decorate the wards. Hon. D. N. Morgan presented a map of Connecticut, prepared by the recent U. S. Geological Survey. Prayer book and hymnals were given by Prof. Binney. Books were given by the Commissioner General of the Argentine Republic, by Mr. Frank B. Weeks, Mr. Edward B. Wells, Mr. Frank A. Young. The current numbers of the Century Magazine were contributed by Mr. L. R. Hazen, and a large box of periodicals by Mr. D. S. Moseley. Illustrated magazines and other periodicals were received from Mr. H. D. A. Ward, Mrs. B. N. Tompkins, Miss Etta Taylor, Mrs. J. M. S. Carter, Mr. G. R. Knowles, Mr. W. W. Wilcox, Mr. Frank B. Weeks; illustrated papers from Mrs. A. R. Parshley, Dr. F. S. Quackenbos, the publishers of Puck, and the Middletown Y. M. C. A. Religious papers came from Rev. Henry A. Starks, Mr. L. R. Hazen, Prof. C. T. Winchester, Mrs. L. B. Culver. In Fairfield County Mr. Charles H. Meder collected four boxes of miscellaneous reading matter. Thanks are also due for contributions from unknown sources in the "Hospital Box" which Mr. Hazen kindly permits to stand in his store. Files of exchanges from the office of the Penny Press gave pleasure to patients, likewise indebted to the publishers of the following newspapers for gratuitous copies:

The Courant, daily, Hartford.
The Times, weekly, Hartford.
The Religious Herald, weekly, Hartford.
The Palladium, weekly, New Haven.
The Connecticut Catholic, weekly, Hartford.
The Middlesex County Record, weekly, Portland.
The Colchester Advocate, weekly, Colchester.
The Morning News, daily, New Haven.
The Tolland County Journal, weekly, Rockville.
The Herald, daily, Middletown.
The Standard, weekly, Bridgeport.

It is a particularly gratifying reflection that the resident officers and heads of various departments, who by long experience have become familiar with affairs, continue in the service of the Hospital with undiminished devotion and ability. Others, who have shown no less fidelity and efficiency in their respective spheres of duty, are equally deserving of praise. To work with such help, laboring together harmoniously, is indeed satisfactory.

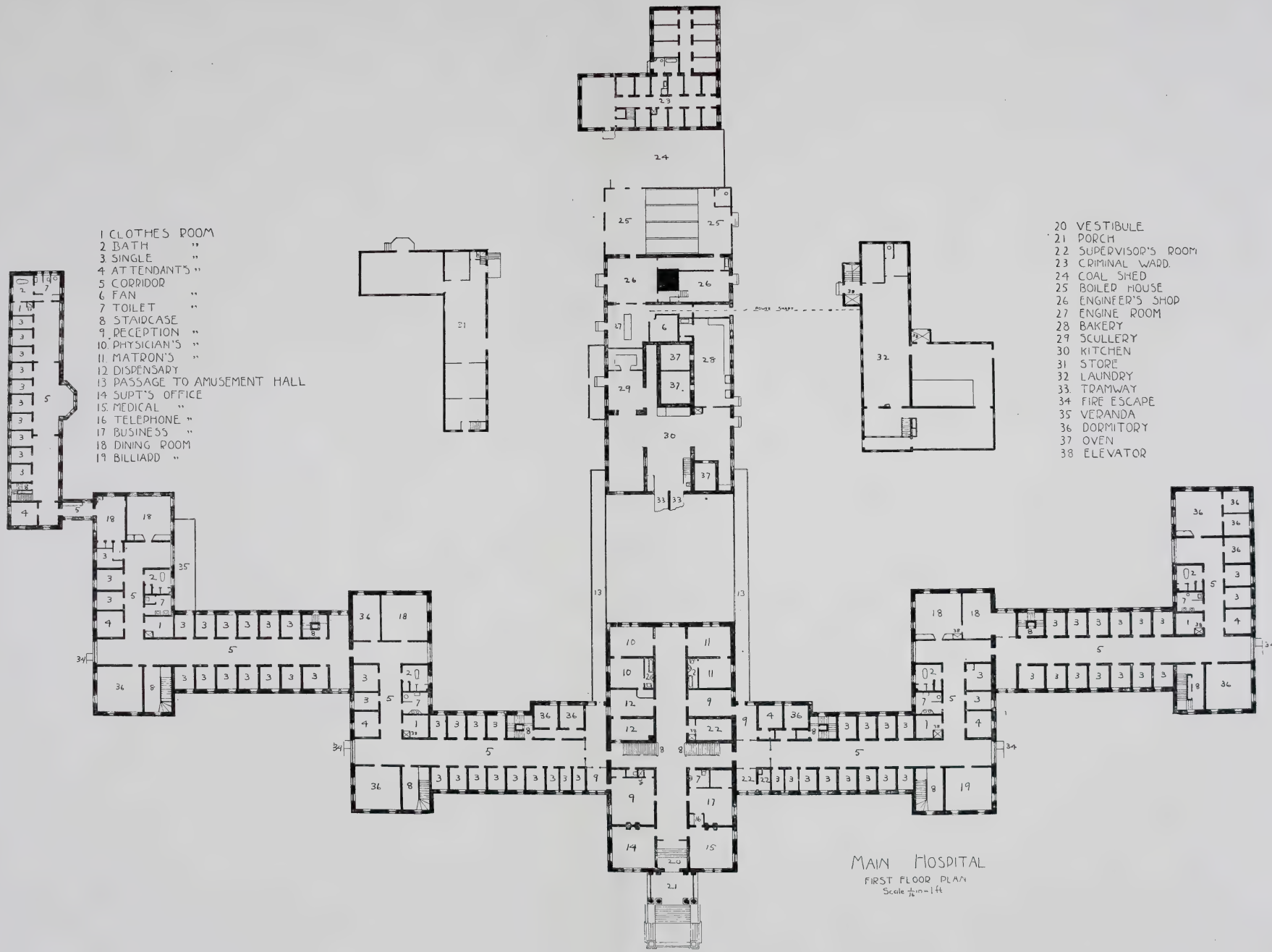
Your constant interest in the progress of the Hospital and the welfare of its patients, and the frequent opportunities for consultation with the committees of your Board and with individual members have been most welcome and beneficial.

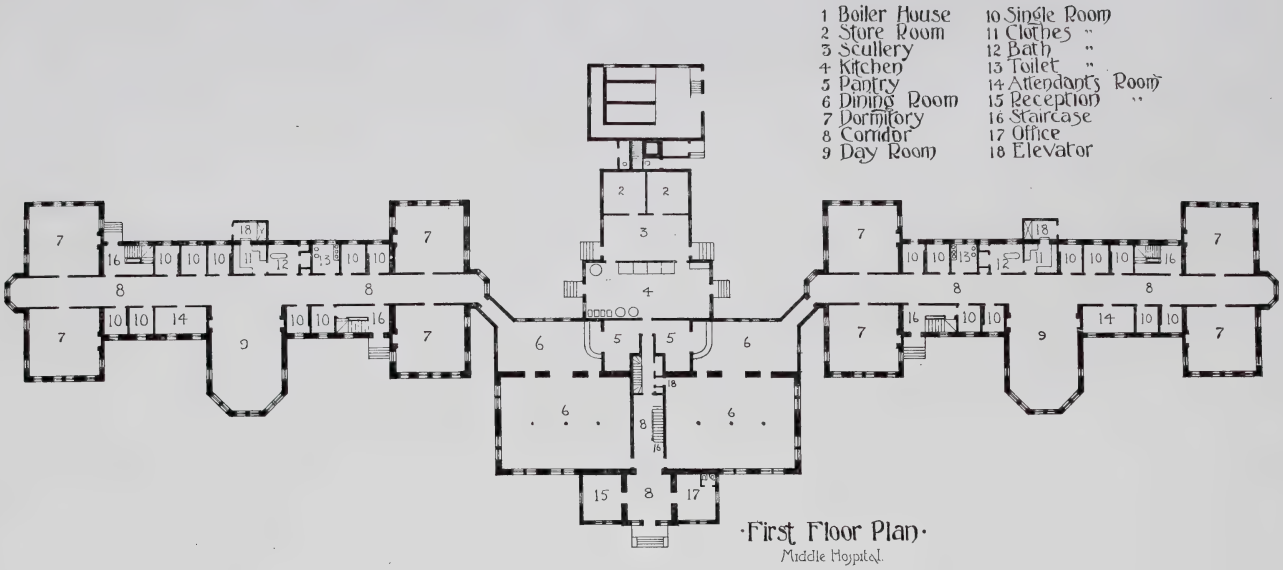
With the earnest hope that the philanthropic purposes, for which the institution exists, may with its growth be accomplished more perfectly than in its youth, this report is

Respectfully submitted,

JAMES OLMSTEAD, M. D.,
Superintendent.

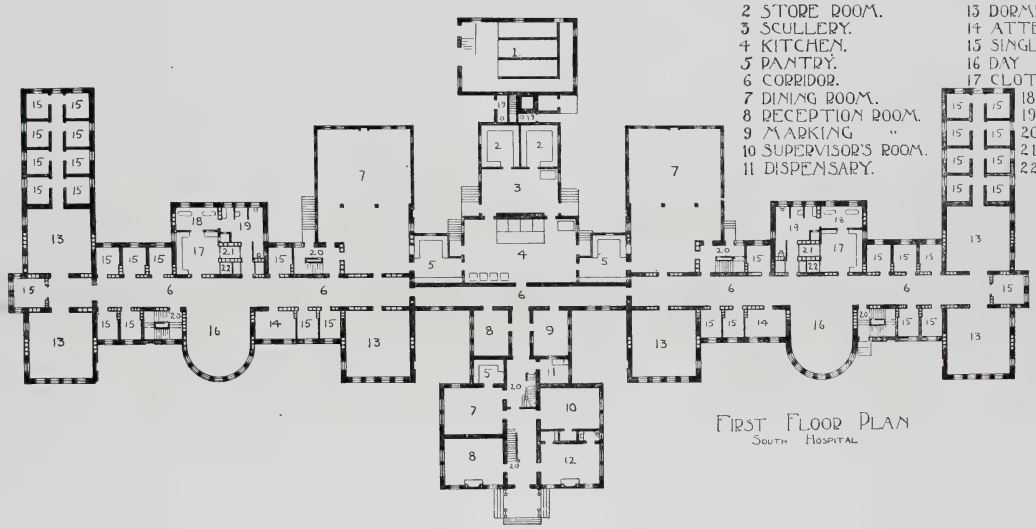
Middletown, Conn., June 30, 1894.


1 CLOTHES ROOM
2 BATH "
3 SINGLE "
4 ATTENDANT'S "
5 CORRIDOR
6 FAN "
7 TOILET "
8 STAIRCASE
9 RECEPTION "
10 PHYSICIAN'S "
11 MATRON'S "
12 DISPENSARY
13 PASSAGE TO AMUSEMENT HALL
14 SUPT'S OFFICE
15 MEDICAL "
16 TELEPHONE "
17 BUSINESS "
18 DINING ROOM
19 BILLIARD "
20 VESTIBULE
21 PORCH
22 SUPERVISOR'S ROOM
23 CRIMINAL WARD.
24 COAL SHED
25 BOILER HOUSE
26 ENGINEER'S SHOP
27 ENGINE ROOM
28 BAKERY
29 SCULLERY
30 KITCHEN
31 STORE
32 LAUNDRY
33 TRAMWAY
34 FIRE ESCAPE
35 VERANDA
36 DORMITORY
37 OVEN
38 ELEVATOR
MAIN HOSPITAL
FIRST FLOOR PLAN
Scale 1/16 in = 1 ft



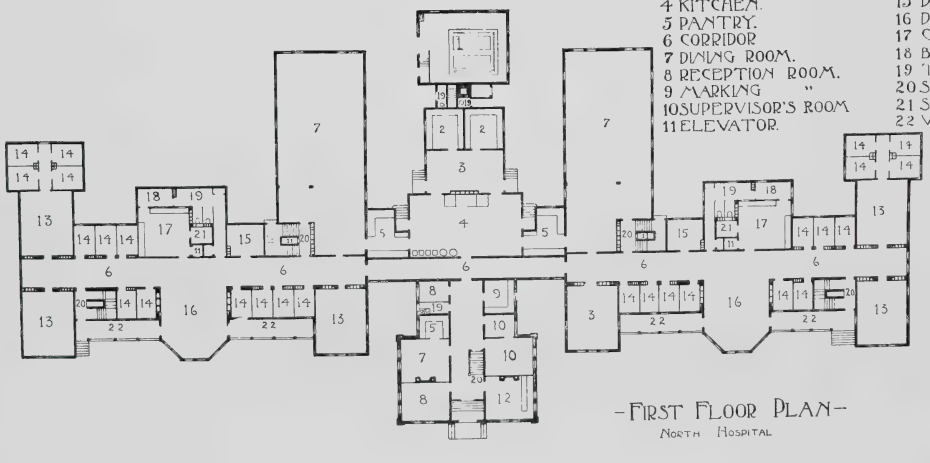
·First Floor Plan·

Middle Hospital.



FIRST FLOOR PLAN

South Hospital



-FIRST FLOOR PLAN-

North Hospital

MEMORANDA

OF THE

FIRST QUARTER CENTURY

OF THE

Connecticut Hospital for the Insane.

The spring of 1893 really witnessed the completion of the first quarter century of the Hospital's existence, for although conceived in 1866 by the "Act to create a hospital for the insane in the State of Connecticut," which was followed by the chrysalis stage of development, its birthday cannot truly be said to have occurred until it was delivered to the public, April 30, 1868, a sturdy infant, ready to begin the ever-extending career of usefulness to humanity, fitly predicted by the inspiring words of the preamble to the act of its creation.

"*Whereas*, The report of the commission appointed by this Assembly in the year 1865, shows that there are seven hundred and six insane persons in the State of Connecticut, of whom two hundred and two are in the Retreat at Hartford; two hundred and four are in the almshouses; and three hundred outside of both; and whereas, it is impossible to secure suitable care and medical attention for this large and deeply afflicted class, either in the Retreat or in the almshouses, or in private houses; and whereas, considerations of humanity and of true economy, as well as public welfare, and of our holy religion, all alike demand that these persons should liberally be provided for by the State; therefore, be it enacted by the Senate and House of Representatives in General Assembly convened."

Then follow the several sections of the act, which as modified and supplemented by other later acts, appears in the revision of the General Statutes, 1888, as follows:

"The land of the State and its appurtenances in Middletown shall be and remain the Connecticut Hospital for the Insane.*

"Its government shall be vested in a board consisting of the Governor and twelve trustees to be appointed by the Senate, one from each county and four from the vicinity of the institution. During the regular session of the General Assembly of 1889 the Senate shall appoint six of said trustees, of whom three shall hold office for four years from the first day of July, 1889, and three for three years from the first day of July, 1890. During the regular session of the General Assembly of 1891, and biennially thereafter, the Senate shall appoint six trustees, who shall hold office for four years from the first day of July following their appointment. The Governor may fill any vacancy which occurs during the recess of the General Assembly, until its next regular session. No trustee shall receive compensation for his services.

"The trustees shall have charge of the general interests of the institution, make and execute its by-laws, appoint and remove its officers and attendants, fix their compensation, exercise a strict supervision over all its expenditures, and may receive by bequest, devise or gift, property for the use of the Hospital.†

"They shall appoint a superintendent, not of their own number, who shall be a competent physician and reside in or near the Hospital.

"They shall appoint a treasurer, with a salary not exceeding four hundred dollars a year, who shall give a bond to the State of ten thousand dollars to account faithfully for all property received by him as treasurer, and keep accurate accounts of his receipts and expenditures, and of the property entrusted to him, which accounts, with the vouchers, shall be submitted quarterly, and oftener if required, to the trustees, with a written statement of his disbursements and funds in hand; and his books shall be at all times open to the trustees."

* "And said Connecticut Hospital for the Insane shall have power to sue in its own name for all debts or demands due to said Hospital."—*Public Acts, 1889, Chap. 129, Sec. 1.*

† "And may make purchases of lands, and take deeds therefor in their own name."—*Public Acts, 1889, Chap. 129, Sec. 2.*

From 1866, then, the successive Governors of Connecticut have been *ex-officio* members of the Board of Trustees. The names of the other members and the terms of their service are as follows:

Trustees.	Service Began.	Service Ended.
Robbins Battell,	1866	1891
William B. Casey, M. D.,	1866	1870
Richard S. Fellowes,	1866	1884
H. Sidney Hayden,	1866	1889
Leverett E. Pease,	1866	1869
B. W. Tompkins,	1866	1869
Samuel G. Willard,	1866	1887
Curtiss T. Woodruff,	1866	1870
Joseph Cummings, D. D.,	1867	1877
Benjamin Douglas,	1867	1894
Julius Hotchkiss,	1867	1878
Lucius S. Fuller,	1869	1890
John Tracy,	1869	1870
Joseph D. Bates,	1870	1876
Henry Woodward,	1870	—
Samuel Lynes, M. D.,	1871	1876
Richmond M. Bullock,	1876	1883
Ezra P. Bennett, M. D.,	1876	1881
Elisha B. Nye, M. D.,	1877	1889
Joseph W. Alsop, M. D.,	1878	1891
James G. Gregory, M. D.,	1881	1884
James G. Gregory, M. D.,	1888	1891
Clark E. Barrows,	1884	1890
Henry B. Harrison,	1884	1885
Henry P. Geib, M. D.,	1884	1888
James E. English,	1885	1889
Costello Lippitt,	1887	—
Leverett M. Leach,	1887	1891
James Graham,	1889	1891
Edward S. Cleveland,	1889	1893
John N. Camp,	1889	1893
George H. Nichols,	1890	—
Wilbur B. Foster,	1891	—
William Bissell, M. D.,	1891	—
Austin E. May, M. D.,	1891	—
Andrew C. Smith,	1891	—
Elijah K. Hubbard,	1891	—
Samuel Russell,	1891	—
William D. Morgan, M. D.,	1893	—
Frank B. Weeks,	1893	—
Horace F. Boardman,	1894	—

Superintendents.	Service Began.	Service Ended.
Abram Marvin Shew, M. D., - - - - -	1866	1886
James Olmstead, M. D., - - - - -	1886	—
Treasurers.		
Abram Marvin Shew, - - - - - -	1866	1867
M. B. Copeland, - - - - - - -	1867	—

Middletown, picturesquely situated on a bend of the Connecticut River, nearly at the center of the State and easily reached from all points within its circumference, was chosen as the location for the Hospital, not only because central, but also because here it was possible to obtain by gravity abundance of water and to dispose of sewage by the simple method of surface irrigation on the farm; and the river is conveniently near for the delivery of coal and other freight. The people of Middletown warmly welcomed the institution by granting a suitable farm and valuable water privileges, as fully set forth in the following pledge of conveyance by the town to the State:

"*Whereas*, The State of Connecticut, by recent act of the Legislature, has decided to establish a 'General Hospital for the Insane of the State,' and has entrusted the selection of a site for the same, to a board of trustees, chosen by said Legislature, which board signified its wish to receive propositions relative to this object, from any town in the State; and,

"*Whereas*, The town of Middletown, at a special meeting duly called, and held on the 4th day of August, 1866, did vote to appropriate a sufficient sum of money for the purchasing and presenting to the State a suitable farm, on condition that said Board of Trustees select some locality in the town of Middletown as the site for said Hospital for the Insane, and whereas, the said town of Middletown did, at other special meetings duly held, viz., on the 12th and 24th days of October, A. D. 1866, vote the sum of twenty-five thousand dollars, to pay for such lands as may be so selected, in case said Hospital should be located in Middletown, and in such case did also vote to guarantee to said Board of Trustees the full and complete use and enjoyment of the water of Butler's creek and Silver creek, so called, or either of them, and to procure such lands, title and interest as may be deemed expedient, for the purpose of making reservoirs upon said streams and to lay down pipes to convey the water from said streams for the use of said Hospital, with the right also to

use the town wharf at Butler's creek by said Trustees, for purposes connected therewith; and,

"*Whereas*, The said Trustees, at a meeting of their Board held at Middletown on the 15th day of October, A. D. 1866, for the purpose of deciding the question of locating the site for said Insane Hospital; after a full hearing of all parties interested and upon all propositions that were made to said Board of Trustees for this purpose, did vote unanimously to locate said General Hospital for the Insane of this State, at Middletown, and upon the lands of Joseph Tryon, Reuben R. Tryon, Elijah Tryon, Charles H. Williams, Elias Paddock, Stephen H. Paddock and a piece of land belonging to said town of Middletown; and the above said owners of said lots of land, having severally executed warrantee deeds, (agreeable to the survey) to the "Trustees of the General Hospital for the Insane of the State," amounting in the aggregate to one hundred and fifty-eight acres, be the same more or less, which deeds are duly recorded at the Registrar's office, in said Middletown, and have been by us placed in the hands of said Trustees to their satisfaction. And,

"*Whereas*, The town of Middletown at a meeting duly held on the 24th day of October, A. D. 1866, did also 'resolve that this town does hereby guarantee to the "General Hospital for the Insane," the title to such lands, water courses, roads, wharf and other property located or pertaining to said lands, for the said institution.'

"In accordance with the above votes and instructions, we, the Selectmen of the town of Middletown, in order to make the conveyance of the town to the State complete and satisfactory, do give our official pledge in behalf of said town, in accordance with the will of its citizens so unanimously expressed, and do hereby guarantee the title to said lands and water courses pertaining to said lands, with the free occupancy of the town wharf at Butler's creek, to the use of said institution; relying upon the good faith of the said Trustees, and the State which they represent, to fulfill upon their part the agreement therewith.

MIDDLETOWN, MIDDLESEX COUNTY, CONN., Oct. 30, 1866.

P. FAGAN,
ALFRED HUBBARD,
EDWIN SCOVILL,
A. C. ARNOLD,
} *Selectmen of the Town of Middletown.*

Besides the land given by the town of Middletown, eighty acres adjoining were purchased, and a building site in every respect admirable was thus obtained. From time to time other purchases of land have been required by the growth of the Hospital, until in 1893 the total amounted to 466 acres.

WATER SUPPLY.

	Reservoir No. 1.	Reservoir No. 2.	Reservoir No. 3.
Date of Construction,	1867	1879–82	1890–1
Distance from Hospital by pipe line,	6,500 feet	8,500 feet	8,000 feet
Source of water,	Butler's creek	Butler's creek	Silver creek
Elevation above first floor of the Main Hospital building,	74 feet	175 feet	160 feet
Capacity,	18,000,000 gals.		25,000,000 gals.

In 1867 connection was made with the first reservoir by cast-iron pipe six inches in diameter. In 1887 a companion water main eight inches in diameter was laid and so combined with the former that both at the same time or either one interchangeably may be used.

BUILDINGS.

After the site was chosen, building operations progressed sufficiently to permit the corner stone of the Hospital to be laid June 20, 1867, with appropriate ceremonies in the presence of a large and enthusiastic assembly. On May-day, 1868, the center and one wing of the main building were ready for the accommodation of patients. During the succeeding six years the other three wings were added one by one, and in 1874 the Hospital was considered to be complete, having beds for 450 patients.

This massive stone structure, four stories high, was built on the so-called "linear" plan with eight wards for patients, on each side of the central portion, in which were the kitchens and offices. Back of the center and connected by an underground tramway were the laundry, bakery, sewing-room, engine-room and the boilers. Still further back was the "Annex," at first used as a joiners' and painters' shop, although erected "with the ulterior view" of being devoted

to the isolation of insane convicts. — *Superintendent's Report, 1872.*

Already the utility of the "cottage system" had been demonstrated by lodging certain demented patients in two old dwelling houses left standing on the Hospital grounds. By the river, a third of a mile away, was the Hospital dock and near it the coal house. A large barn and a piggery completed the list of structures at that time. The total appropriations for land and construction, 1866-1876, amounted to $640,043.

These provisions did not long suffice, for in their report to the Legislature of 1877 "as the Trustees do not deem it desirable to enlarge this Hospital they earnestly urge the importance of immediate provision for the erection of a new hospital;" and to the Legislature of 1878 they mention the urgent need of "another hospital of similar grade," and they "earnestly hope that the State of Connecticut will make appropriation for a new hospital." The next year the Board repeated this advice, as the Hospital was overcrowded and insane persons were obliged to wait for weeks to be admitted or else be cared for in other institutions.

It was also in 1879 that a commission, consisting of Gurdon W. Russell, M. D., Henry W. Buel, M. D., and Ephraim Williams, Esq., appointed by the Governor to investigate the need of further accommodations for the insane poor of the State and to report upon the location and plans for such hospital buildings if needed, reported to the General Assembly that further accommodations were necessary, there being about four hundred insane poor for whom the State had made no hospital provision, and they recommended erecting in the immediate vicinity of the existing Hospital, plain buildings of brick containing 250 beds.

"The buildings which we suggest, and others which may be necessary in future years, may all be congregated at Middletown, and administered with no great difficulty. The plea that it is not proper to bring many of these people together, has but little force in it, when we remember the large number in some hospitals in our own country and in many in Europe; and notwithstanding the declarations which have been made against this, the hospitals recently built have been designed to accommodate more patients

than formerly. It may fairly be claimed that every first-class institution should have connected with it a supplemental building, plainer and cheaper than its principal one, for the accommodation of its harmless insane. For these, less spacious and less guarded rooms are needed, and fewer attendants. If this seems to be a new departure, it is one worthy of trial, and certainly better than retaining these people in almshouses, in towns, or among indifferent, discouraged, and too often neglectful relatives."

Nevertheless, no legislative action was taken until the following year, when it was resolved by the General Assembly and approved by the Governor, March 24, 1880, "that a committee of three be appointed by the Governor, who shall cause to be built within one year, additional buildings for the accommodation of the insane, adjacent to the present Hospital at Middletown, according to the plans and estimates of the commission presented to this General Assembly; and that there be appropriated from any moneys now in the Treasury of this State a sum not exceeding $130,000, for the erection and furnishing of said buildings; said sum to be subject to the order of said committee to carry out the provisions of this resolution; provided, that no part of this appropriation shall be expended until said committee have made a contract with responsible parties to fully complete said buildings, and there shall not be drawn from the amount appropriated, at any time, a sum larger than is needed to pay for work done or expenses actually incurred; and all expenses of every name and nature that may be incurred shall not exceed the amount hereby appropriated. Said committee shall make report to the next session of the General Assembly; provided, that of the sum hereby appropriated not less than $5,000 shall be reserved for the construction of suitable buildings or apartments upon the grounds of said Connecticut Hospital for the Insane, wherein insane convicts shall be placed and cared for separate from the other inmates of said Hospital."

In accordance with this act the Governor appointed as a building committee Melancthon Storrs, M. D., Wm. J. Atwater and Chas. G. R. Vinal, Esq., who immediately entered upon their duties. It was agreed with the Board of Trustees that there should be a common bakery and laundry

for both the old and the new buildings, and the sum of $3,500 was set apart from the total appropriation for that purpose. Under the direction of the Trustees a suitable laundry building was erected and the space formerly occupied by the laundry was ample for enlargement of the bakery.

It was found that the inclination of the ground at the south end of the proposed building favored the construction of a small ward in the basement, and the required separate apartments for insane female convicts were there provided, the Trustees having already devoted the "Annex" to the use of male convicts.

To the Legislature of 1881, then, the Committee were able to report satisfactory progress, and July 20th the building, finished and furnished with two hundred and sixty-two beds for patients, at an expense of $130,000, was formally transferred by the Committee to the Board of Trustees. This was made the occasion of a memorial gathering of many friends of the Hospital. Among their honored guests the Trustees especially noted the presence of the venerable alienist, Dr. Pliny Earle, who had made an address at the laying of the corner-stone fourteen years previously and now took this opportunity to commend the advance in the work of the institution.

The pressing need of more room may be inferred from the fact that while only 144 patients could be received in 1880, and the number present at the end of the year was 528, in 1881, the new building having been opened, 352 patients were admitted and 731 were present at the end of the year. It is not surprising, therefore, that the new building was soon filled to excess and that the Legislature in 1884 and 1885 made appropriations for the erection, on land purchased by special appropriation in 1882, of an additional building "for the care of the insane of this State, and particularly to furnish one or more wards for the better classification and accommodation of the epileptic insane."

This building, completed early in 1886 and furnished with 300 beds, stands about 175 feet south of the building erected in 1881, both fronting westward, and resembling one another in the essential features of their internal arrangements. Each is of brick, three stories high; each has six wards,

containing fifty beds, more or less, in rooms on either side of a long corridor, broken in the center by a bay which serves as a day-room; each has two large dining-rooms where the patients congregate for their meals. In this particular these two buildings differ markedly from the old main building, in which every ward has its separate dining-room to prevent patients recently admitted from exerting unfavorable impressions upon one another. Inasmuch as a certain proportion of the recent admissions are acute cases presenting widely different phases of insanity, the advantages of segregation are obvious. But in the mass of chronic cases where fine classifications are needless, congregate dining-rooms have been found to facilitate inspection and the accurate distribution of food, to prevent waste and to diminish the cost of support.

The total number of patients was now above one thousand, and although the price of board had been reduced to $3.50 a week, the revenue began to exceed the cost of maintenance. The resulting surplus of cash enabled the Trustees to make several improvements rendered necessary by the growth of the Hospital. An addition to the annex provided a workshop for convicts. A reception room and a medical office were added to the Middle Hospital. A supplemental water main was laid; a green house and bowling alley were built; a brick cottage, accommodating seventy patients—chiefly those working out of doors—permitted an unsightly and too-distant frame cottage to be vacated. A horse barn, coal houses, an ice house and a cottage for employés were also erected.

Not only tacitly did the Legislature approve these expenditures, but in 1889, the Hospital then having 1,300 patients, it was resolved by the General Assembly that the Board of Trustees be authorized and instructed to expend from the funds of the Hospital an amount necessary to erect a building furnishing accommodations for at least 120 persons. By an addition to each wing of the South Hospital, and by the completion of the unpretentious, but very comfortable and convenient cottage, of which one-third was built the year before, 150 patients were accommodated.

Other items of construction followed, of which the most costly was an assembly room, seating over 600 persons, the original chapel and amusement hall being no longer adequate. This new room directly in the rear of and on the level of the

second floor of the Main Hospital, was appropriately located with special reference to the benefit of curable patients, who can reach it by means of covered bridges, without risk of escape or exposure to the inclemencies of the weather.

As the number of patients again exceeded the capacity of the institution and a disposition to enlarge it still further was manifested in the Legislature, it was voted at a special meeting of the Board of Trustees, April, 1889, that "in the opinion of this Board the economic and humane interests of the State require that additional accommodations for its insane be provided in some other locality."

Influenced doubtless by this advice, the General Assembly of 1889 resolved that "a committee of three persons be appointed by the Governor to inquire and report to the next session of the General Assembly concerning the expediency and practicability of providing further accommodations for the insane at Middletown or elsewhere in the State." On this committee the Governor appointed Hon. Lyman S. Catlin, George E. Markham, M. D., and Stephen A. Gardner.

The lamented death of Dr. Markham early deprived the committee of his aid, but the other members carefully investigated the condition of affairs and reported to the General Assembly, January, 1891, that in their opinion this institution should not be again enlarged, but should be relieved as soon as possible of many of its apparently hopeless, chronic cases by the erection of an asylum for the humane care of such cases, in order that the Hospital at Middletown might always have room for the prompt admission of acute cases of insanity. The increase in population being apparently greater in the southwestern portion of the State than elsewhere, the committee advised that the proposed asylum be located in Fairfield County.

Action on this report was postponed until 1893, when the General Assembly resolved "that a building committee of five members, three of whom shall be elected by the Trustees of the Connecticut Hospital for the Insane, and two of whom shall be elected by the Senate, be and are hereby authorized and directed to cause the erection in the town of Middletown, of a suitable building sufficient for the accommodation of two hundred and fifty insane persons of the class known as incurable insane.

"Said committee is hereby authorized and directed to expend for said purpose such a sum of the moneys now held by said Trustees of said Hospital, not to exceed $70,000, as shall be necessary.

"A further sum of $30,000, or so much thereof as shall be necessary, is hereby appropriated from the State Treasury, to furnish and complete said building."

This act having been approved June 30, 1893, the Senate elected Hon. Seth J. Hall and Matthew T. Newton, M. D., and the Trustees elected from their number Messrs. Henry Woodward, Andrew C. Smith and Samuel Russell to be members of the building committee.

Already the Trustees, finding the water supply insufficient in the time of drought, had availed themselves of the privileges guaranteed to them by the town of Middletown, "the full and complete use and enjoyment of the water of Butler's creek and Silver creek," by purchasing the requisite land and constructing a reservoir on Silver creek of larger capacity than both the reservoirs previously located on Butler's creek; so there was no question about a source of water ample for the population to be added. Fortunately, too, at this time a farm extending from the northern limit of the Hospital grounds to the Connecticut river was for sale, and its purchase provided a most admirable site for the future buildings.

APPROPRIATIONS BY THE GENERAL ASSEMBLY FOR LANDS AND BUILDINGS.

Dates.	Amounts.	Purpose of the Appropriation.
1866	$35,000 00	To establish a Hospital for the Insane.
1867	150,000 00	For the needful expenditures of the General State Hospital for the Insane.
1868	200,000 00	For the needful expenditures of the General State Hospital for the Insane.
1869	35,543 00	For the needful expenditures of the General Hospital for the Insane.
1871	90,000 00	For one additional wing to the General Hospital for the Insane.
1872	90,000 00	For one additional wing to the General Hospital for the Insane.
1872	39,500 00	In favor of the Trustees of the General Hospital for the Insane.
1880	130,000 00	For building an addition to the Insane Asylum at Middletown.

Dates.	Amounts.	Purpose of the Appropriation.
1881	$10,000 00	For barns, workshops, laundry apparatus and fire protection.
1882	8,000 00	For the purchase of land for buildings.
1884	75,000 00	For additional buildings for the care of the insane.
1885	50,000 00	For additional buildings for the care of the insane.
1893	30,000 00	For the completion of a building accommodating 250 patients.
Total,	$943,043 00	

ADDITIONAL CONSTRUCTION NOT COVERED BY APPROPRIATIONS.

Dates.	Amounts.	Purpose of the Expenditures.
1878	$2,524 71	Storehouse.
"	2,307 37	Amusement hall.
"	9,487 96	Altering Annex for patients.
1880	1,664 55	Cottage for engineer.
"	3,234 80	Horse barn.
"	2,820 82	Reservoir No. 2.
1883	5,517 00	Coal house and hoisting apparatus.
"	2,284 83	Piggery.
1884	22,233 80	Additional wing on Main Hospital.
"	970 65	Cold storage.
"	1,136 88	Addition to Middle Hospital.
1885	1,337 69	Addition to laundry.
"	4,361 45	Carpenters' shop.
"	10,855 00	Superintendent's cottage.
1886	4,463 10	Addition to Annex.
"	1,546 54	Addition to Middle Hospital.
1887	4,391 00	Eight-inch water main.
"	7,124 61	Greenhouse and bowling alley.
1888	16,627 86	South wing of Main Cottage.
"	7,526 52	Barn for farm horses.
"	1,614 00	Elevator.
"	2,302 89	Ice house.
"	2,211 90	Coal houses.
"	4,382 96	Cottage for employés.
1889	18,000 00	Addition to South Hospital.
1890	32,093 45	Completion of Main Cottage.
"	7,518 78	Alteration of heating system, Main Hospital.
"	2,874 37	Slaughter house.
"	1,588 24	Iron balcony, Main Hospital.
"	1,846 53	Addition to Middle Hospital.
"	1,080 66	Addition to cold storage.
"	1,777 00	Land for Reservoir.
"	8,539 54	Reservoir No. 3.

Dates.	Amounts.	Purpose of the Expenditures.
1891	$1,575 60	Connection of Reservoir with 8-inch main.
"	4,441 67	Addition to laundry.
"	23,698 40	Assembly room.
1892	1,077 55	Addition to store.
"	2,789 00	Ice house.
"	2,328 48	Piggery.
"	2,016 66	Extension of sewage irrigation.
1893	3,004 08	Night attendants' cottage.
1893	70,000 00	Expended by Act of the General Assembly in making accommodations for 250 patients.
Total,	$309,178 82	

COMMITMENT OF PATIENTS.

As early as 1867 an act was passed, which with certain modifications, has continued in force during all these years, appearing now as Sec. 487 of the General Statutes, and has provided for the commitment and maintenance of more than 88 per cent. of all the patients admitted. As at present, the act originally contemplated two classes of indigent patients, those who are paupers and those who are not. And it provided that when a pauper in any town may be insane, a Selectman of such town shall apply to the Judge of Probate of the district wherein said pauper resides, for his admission to the Hospital, and that the Judge on receiving a certificate from a respectable physician that said pauper is insane, shall issue an order requiring the Selectman to take such insane pauper to the Hospital, where he shall be kept and supported as long as may be requisite. It also provided that "when a person in indigent circumstances, not a pauper, becomes insane, application may be made in his behalf to the Judge of Probate for the district wherein he resides," who after due investigation, including an examination by a respectable physician, if satisfied that such person is in indigent circumstances and insane, shall issue an order of commitment to the Hospital, where he shall be kept and supported as long as may be requisite, half of the expense of his support to be paid by the State and the other half by the person making application for the patient's commitment. The original act specified that the person making application for the commitment be directed by the Judge to take the patient to the Hospital. The present law adds a clause leaving it optional with the Judge to appoint some other escort, but the responsibility of providing a companion for the insane person on the

journey is distinctly laid on the Court. The principal point of difference between the original and the present law is that at first it was provided that half the expense of a pauper's support "be defrayed by the town wherein said pauper resides and the other half by the State;" but since 1878 the law has been "that $2.50 per week of the expense of his support shall be paid by the town legally chargeable with his support and the balance by the State." Inasmuch as the price of board has been considerably reduced, this throws upon the towns a greater expense than would have been the case if the original act had continued in force. Moreover, the present law, unlike the original, enables a Selectman who has applied for a pauper's commitment to evade paying his board on the plea that some other town is legally chargeable with that expense, and the Hospital may even be put to the loss and trouble of ascertaining by a lawsuit what town is legally chargeable.

For the commitment of insane criminals to the Hospital the provisions of the law are ample. The year after the Hospital was opened, it was resolved by the General Assembly (Private Acts, 1869, Chap. 159,) that the Trustees of the Hospital be "required and directed to make suitable provision for the reception of insane convicts into the institution under their care and direction;" and it was enacted that the Governor, on receiving a report from the Warden of the Prison that any convict is insane, shall appoint not more than three physicians to examine such person, and upon their certificate of insanity the Governor shall order his transfer to the Hospital. If the convict recovers before his term of sentence expires, similar proceedings result in his return to prison. If he is still insane at the expiration of his term of imprisonment, the Governor is authorized to order a further detention of the convict in the Hospital until he shall have recovered.—*General Statutes, Sec. 3617-3621.*

If any person serving sentence in a county jail appears to be insane, proceedings similar to those in regard to convicts in the State Prison may be instituted for his transfer to the Hospital, or the County Commissioners may appoint "some reputable physician to make an examination of such prisoner, and if such physician shall be of the opinion that such prisoner is insane," and shall so certify to the Commissioners, they may cause the prisoner's removal from the Jail to the

Hospital. — *General Statutes, Sec. 3385, 3386 and Public Acts, 1893, Chap. 46.*

When any person committed for trial to a county jail shall in the interim appear to be insane, a Judge of the Superior Court on application of the County Sheriff may appoint "three reputable physicians," upon whose certificate of insanity the Judge may order the person to be transferred from the Jail to the Hospital for treatment until the time of trial.— *General Statutes, Sec. 1600.*

"Any Superior Court, City Court or Police Court in this State, before which any person shall be tried on any criminal charge and acquitted on the ground of insanity or dementia, may order such person to be confined in the Connecticut Hospital for the Insane for such time as such court shall direct," and any such person may subsequently petition, or the officers of said institution may petition the Superior Court of the county in which he is confined for his enlargement. But if at the expiration of any specific term for which the Court may have ordered him to be confined, the person shall still be insane, the Superintendent of the Hospital shall certify this fact to the State's attorney for the county wherein the trial was had, to the end that an order of the Court may be procured, authorizing the continued detention of the person in the Hospital until recovered from his insanity.—*General Statutes, Sec. 1601–1603.*

The next two following provisions appear to have been made with special reference to the commitment of non-resident persons: "On a written complaint, made to any Judge of the Superior Court, that a person named therein is insane and unfit to go at large, such judge shall immediately appoint a committee consisting of a physician and two other persons, one of whom shall be an attorney-at-law, judge, or justice of the peace, who, after such person has been notified according to the order of such Judge of the Superior Court, shall inquire into such complaint and report to him the facts of the case and their opinions thereon; and if, in their opinion, such person should be confined, such judge shall issue an order therefor."—*General Statutes, Sec. 3683.*

"Any insane pauper, not a resident of any town in this State, may be committed by the Governor to any suitable place of detention, upon the presentation of a certificate

signed by a reputable physician that he has found upon examination that such pauper is insane, which certificate shall be sworn to before some officer authorized to administer oaths. The support of paupers committed under the provisions of this act shall be paid by the State, the same not to exceed $3.00 a week for each person so committed."—*Public Acts, 1893, Chap. 241.*

"All honorably discharged soldiers, sailors and marines, who served in the Union army or navy in the late civil war, in the Connecticut regiments or navy quota from this State, and all such soldiers, sailors and marines who served in said war in the regiments or navy quota from any other State, who at the time of enlistment therein were residents of this State, and are such residents when applying for such aid," if insane, are entitled to receive such medical care as may be necessary in the Hospital at the expense of the State, on order of the Soldiers' Hospital Board.—*General Statutes, Sec. 3762.*

For twenty years private patients were "put in any suitable place of detention on the presentation of a certificate made within thirty days, signed by some reputable physician, that he has made a personal examination of such person within one week prior to the date thereof, and that such person is insane, which certificate shall be sworn to before some officer authorized to administer oaths in the State where it is given, who shall certify to the genuineness of the signature thereto, and the respectability of the signer; and any such person may be removed by the person placing him in such place of detention."—*General Statutes, Sec. 3682.*

Finally it was enacted that "except when otherwise specially provided by law, no person shall be committed or admitted to an asylum without an order signed by a Judge of Probate," based upon a written complaint that the person complained of is insane and fit to be confined in an asylum. The Judge shall appoint a time not later than ten days after receipt of such complaint, for a hearing, at which shall be filed a certificate of insanity signed by two physicians, and if satisfied that the person complained of is insane, the Judge shall order him to be taken by some proper officer or any fit person to a designated asylum or other suitable place of detention.—*Public Acts, 1889, Chap. 162, Sec. 3–6.*

Since 1889, private patients have been committed in accordance with the provisions of this act.

This act also affirms the right of persons confined in insane asylums to the benefits of the writ of habeas corpus, and since 1869 the following statute has existed for their protection: "Any Judge of the Superior Court, on information to him that any person is unjustly deprived of his liberty by being detained or confined in an insane asylum, or in any place for the detention or confinement of the insane, or in any inebriate hospital in this State, or in the custody and control of any individual under an order of a Court of Probate, may appoint a commission of not less than two persons, who, at a time and place appointed by them, shall hear such evidence as shall be offered touching the case; said commission need not summon the party claimed to be unjustly confined before them, but shall have one or more private interviews with him, and shall also make due inquiries of the physicians and other persons having charge of such place of detention or confinement, and within a reasonable time thereafter, report to said judge the facts, and their opinion thereon; and if in their opinion the party is not legally detained or confined in such place, or is cured, or his confinement is no longer beneficial or advisable, said judge shall order his discharge; but no commission shall be appointed with reference to the same person oftener than once in six months. The judge before whom any of the proceedings provided for in this section are had, may tax reasonable costs at his discretion."—*General Statutes, Sec. 3692.*

REVENUE OF THE HOSPITAL.

From the outset the law provided that "the price to be paid for keeping any person in indigent circumstances or any pauper, shall be fixed by the Trustees," and that "the Trustees may authorize the Superintendent to admit under special agreements whenever there are vacancies in the Hospital, such cases as may seek admission." — *Public Acts, 1867, Chap. 102, Sec. 5 and 6.*

Of the latter class only 260 persons have been admitted from the opening of the Hospital to July 1, 1893, and all other patients, numbering 6,155, have come under the pauper or the indigent class. It is evident, therefore, that nearly all

the revenue of the Hospital must have consisted of receipts for the care of these beneficiaries. During the first year, 1868–9, the price of board was $4.50 a week for each pauper and indigent patient, but this appeared insufficient. Accordingly it was fixed at $5.00 a week and so continued until 1877. Subsequent changes have been as follows:

Weekly price of board, $4.00 from Dec. 1, 1877, to Dec. 1, 1883.
Weekly price of board, 3.75 from Dec. 1, 1883, to Apr. 1, 1885.
Weekly price of board, 3.50 from Apr. 1, 1885, to Nov.1, 1888.
Weekly price of board, 3.20 from Nov.1, 1888, to Apr. 1, 1892.
Weekly price of board, 3.00 from Apr. 1, 1892, to Apr. 1, 1893.
Weekly price of board, 2.80 from Apr. 1, 1893.

On this basis the entire cost of maintenance, including payroll and repairs, has been provided for.

In July, 1887, interest at 3 per cent. was obtained by the Trustees on the balance in bank, and since then this has been an item in the revenue of the Hospital.

By vote of the Trustees, clothing has been furnished to all pauper patients without charge since January 1, 1892.

In this connection may be mentioned certain bequests to the Hospital.

First, the Atwater fund, created by the following clause in the will of the late George Atwater, of the town of Hamden, dated October 2, 1867:

"I direct and require that the said assistant trustees of my estate shall within two years after the death of my said wife Maria, if she shall survive my said daughter Eunice, or within two years after the death of my said daughter Eunice, if she shall survive her mother, convey to the persons who at that time shall constitute the Board of Trustees of "The General Hospital for the Insane of the State of Connecticut," located in Middletown, to them and their successors in office, all the remainder of my estate, both real and personal, to have and to hold the same in trust for the uses, intents and purposes hereinafter mentioned and declared concerning the same, viz.:

"The said Trustees of the General Hospital for the Insane of the State of Connecticut shall reserve the whole amount received from my estate as a separate fund (to be known as the Atwater fund) for the benefit of the insane poor of the State of Connecticut, and shall have the right to appropriate and expend the annual income of the fund for the support of

indigent insane persons, giving preference to indigent insane persons, if any such there may be, belonging to and having legal residence in my native town of Hamden; but the said Trustees shall not appropriate or expend the principal of the fund."

This trust fund was accepted by a vote of the Trustees of the Hospital, January 14, 1886.

Second, the Sargent fund created by the following clause in the will of George D. Sargent of Hartford: "I give, devise and bequeath to the Connecticut Hospital for the Insane, located at Middletown, Connecticut, the sum of $1,000, in trust as follows: The annual income thereof to be expended for the support and comfort of Caroline B. Sterling, during her life, and at her death the principal of said sum to belong to said Hospital to be disposed of as they see fit."

Mr. Sargent died in 1886, and in June, 1887, the sum of $1,000 was received from the executor of his estate. It was placed at interest under the direction of the Trustees and the income set apart for the use of the beneficiary, who is still living.

ADMINISTRATION.

For the management of the Hospital, Sec. 7, Chap. 102, of Public Acts, 1867, provides that "the Trustees are hereby authorized and empowered to make and establish such by-laws as they may deem necessary and expedient for regulating the appointment and compensation of officers, attendants and assistants, and for conducting in a proper manner the affairs and business of the institution; to ordain and enforce a suitable system of rules and regulations for the internal government, discipline and management of the Hospital."

Accordingly, the Board of Trustees adopted certain by-laws and regulations and revised them in 1887, designating the duties of the persons employed in the Hospital, viz.:

1. The Superintendent, who is required to exercise "entire official control over all subordinate officers," and over the treatment of all patients; to conduct the correspondence and to see that due care is taken of all Hospital property.

2. The Assistant Physicians, each of whom has under his special care a certain number of patients for individual study and treatment.

3. The Clerk, who keeps all the accounts of the Hospital, except those in the hands of the Treasurer, and purchases the groceries, provisions and supplies for the institution.

4. The Farmer, who has charge of the agricultural operations, the butchering, preservation and distribution of meats and the delivery of freight.

5. The Matron, who has charge of all work done in the laundry and the sewing-rooms.

6. The Housekeepers, who have charge of the ordinary domestic matters in their respective households and attend particularly to the preparation of food for the patients.

7. The Supervisors, who have the immediate direction of the ward attendants and instruct them in their duties, such as the management of patients, the nursing of the sick, the prevention of escapes, the care of patients' clothing and the cleanliness of the wards.

8. The Storekeeper, who under the instruction of the Clerk, takes care of the stock in store and issues supplies on requisition of housekeepers, supervisors and others, keeping due account of the same.

9. The Mechanics, comprising the engineer, who has charge of the heating apparatus, plumbing and gas-piping, the joiners, masons and painters, all of whom are needed to keep the property in repair.

The list of resident officers associated with the Superintendent and on his recommendation appointed by the Board of Trustees, is as follows, the names of those serving in such capacity in 1893 being printed in italics:

Assistant Physicians—Drs. Winthrop B. Hallock, Calvin S. May, James Olmstead, *Henry S. Noble*, *William E. Fisher*, *Charles E. Stanley*, *James M. Keniston*, Edwin A. Down, *Arthur B. Coleburn*, A. Josephine Sherman, *Mary Harley*.

Clerks (*Stewards until 1873*)—Charles W. Galpin, J. Delos Atherton, Frank B. Weeks, John W. Thayer, *Thomas M. Durfee*.

Farmers—Clinton W. Weatherbee, *Pliny W. Sanderson*.

Matrons—Mrs. Mary Hallock, *Mrs. Margaret Dutton*.

If asked what the Trustees, using the forces at their command, have done for the insane poor in these twenty-five years, those who recollect the irregular ridge of farming land on which the Hospital has been built, might first point to the pleasing contrast of beautiful lawns with bright flower beds and spacious play grounds, fringed by abundant shade trees and dotted with buildings. Besides the original hospital,

there are now eight other separate structures, varying in capacity from twenty to three hundred beds for the use of diverse classes of patients, who are thus kept in distinct groups apart from one another with evident benefit. Varieties of occupation for patients, at first few, have increased year by year. Music, once limited to the piano, has been cultivated until an orchestra and a band have become ordinary sources of entertainment. So, too, as usually in a home, have the indoor comforts, such as furniture, books and pictures received additions by purchases and by the thoughtful generosity of many friends. Among numerous donations, conspicuous in value and in the gratification afforded all the time, is the chime of bells, given by one of the senior Trustees, which musically intones the passage of each quarter-hour.

Furthermore, it may be said that during its first quarter century, approximately 6,400 fellow creatures, unable to take care of themselves, or perhaps dangerous to the public, have been comfortably lodged, fed and given such medical treatment as they needed, in the State's Hospital; that under this treatment 1,300 patients have recovered their reason, and at least as many more, removed on probation, have been found sufficiently improved to remain away from the Hospital; that for 1,400 patients, whose infirmities caused their earthly lives to be ended here, the burden of disease has been lightened by the ministrations of the physicians and nurses in the Hospital; and that some progress has been made every year in the means of contributing to the contentment and happiness of the large number compelled by mental derangement to make the Hospital their home.

And so, as there is always room for improvements, efforts to make things better must needs ever be continued, even redoubled, since the institution has been enlarged far beyond the limit originally contemplated or recommended. Granting that the ideal hospital may contain not more than four hundred beds, it might be said that here are four such hospitals, absolutely distinct from one another and yet united in a single community. And along with the growth from a comparatively simple to a more complex organization, there has been a natural development of methods of management which, it cannot be doubted, will be further moulded to fit the requirements of the future.

TABLE I.

GENERAL STATISTICS.

	1892–93.			1893–94.		
	Males.	Females.	Total.	Males.	Females.	Total.
Number at the beginning of the year,	696	810	1,506	711	824	1,535
Persons admitted in the year,	169	169	338	213	145	358
Total present in the year,	865	979	1,844	924	969	1,893
Discharged—Recovered,	42	32	74	39	24	63
Improved,	21	20	41	41	27	68
Stationary,	34	42	76	32	49	81
Died,	57	61	118	59	42	101
Remaining at the end of the year,	711	824	1,535	753	827	1,580
Average present during the year,	698.08	810.01	1,508.09	730.09	824.77	1,554.87

TABLE II.

ADMISSIONS AND DISCHARGES SINCE THE OPENING OF THE HOSPITAL.

	Males.	Females.	Total.
Admitted,	3,589	3,184	6,773
Discharged—Recovered,	719	676	1,395
Improved,	552	455	1,007
Stationary,	701	534	1,235
Died,	864	692	1,556

Average Number Present Each Year Since the Opening of the Hospital.

YEARS.	Males.	Females.	Total.
1868–69,	79.35	6.12	85.47
1869–70,	110.63	114.54	225.17
1870–71,	115.97	117.72	233.69
1871–72,	124.21	118.44	242.65
1872–73,	132.11	132.43	264.54
1873–74,	146.43	193.29	339.72
1874–75,	198.54	227.19	425.73
1875–76,	225.60	227.02	452.62
1876—April 1st to November 30th,	228.39	228.57	456.97
1876–77,	231.45	232.43	463.88
1877–78,	236.11	238.06	474.17
1878–79,	244.57	253.76	498.34
1879–80,	250.08	263.95	514.63
1880–81,	293.17	315.39	608.51
1881–82,	357.26	432.01	789.27
1882–83,	385.61	468.89	854.50
1883–84,	402.58	480.64	883.22
1884—November 30th to June 30th, 1885,	427.55	518.76	946.31
1885–86,	487.86	589.98	1,077.84
1886–87,	541.00	652.87	1,193.87
1887–88,	560.40	709.84	1,270.24
1888–89,	598.38	740.76	1,339.14
1889–90,	607.38	746.40	1,353.78
1890–91,	640.15	783.93	1,424.08
1891–92,	687.53	811.35	1,498.88
1892–93,	698.08	810.01	1,508.09
1893–94,	730.09	824.77	1,554.87

TABLE III.

AGES OF PATIENTS ADMITTED.

AGE.	1892–93.						1893–94.					
	When Admitted.			When Attacked.			When Admitted.			When Attacked.		
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
Under 15, -	—	—	—	21	4	25	1	1	2	9	3	12
15 to 20, -	12	5	17	16	13	29	8	3	11	13	8	21
20 to 25, -	15	19	34	15	23	38	23	11	34	29	15	44
25 to 30, -	19	19	38	18	21	39	23	20	43	20	25	45
30 to 35, -	22	18	40	19	23	42	29	20	49	30	20	50
35 to 40, -	23	22	45	15	16	31	21	18	39	15	11	26
40 to 45, -	21	16	37	15	13	28	20	12	32	16	14	30
45 to 50, -	16	20	36	9	13	22	24	17	41	18	10	28
50 to 60, -	17	21	38	13	13	26	34	18	52	17	13	30
60 to 70, -	12	15	27	7	6	13	14	14	28	15	10	25
70 to 80, -	9	8	17	5	5	10	14	9	23	4	3	7
80 and over, -	2	4	6	—	1	1	1	—	1	—	—	—
Unknown, -	—	—	—	15	16	31	—	1	1	26	12	38
Not insane, -	1	2	3	1	2	3	1	1	2	1	1	2
Total, -	169	169	338	169	169	338	213	145	358	213	145	358

TABLE IV.

NUMBER AT EACH AGE SINCE THE OPENING OF THE HOSPITAL.

AGE.	When Admitted.			When Attacked.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 15, -	11	11	22	134	58	192
15 to 20, -	145	105	250	245	211	456
20 to 25, -	375	298	673	437	409	846
25 to 30, -	490	360	850	471	475	946
30 to 35, -	466	398	864	417	393	810
35 to 40, -	431	398	829	354	386	740
40 to 45, -	365	363	728	281	286	567
45 to 50, -	333	335	668	252	259	511
50 to 60, -	454	448	902	339	301	640
60 to 70, -	278	249	527	224	151	375
70 to 80, -	148	119	267	86	84	170
80 and over, -	37	59	96	16	25	41
Unknown, -	12	21	33	289	126	415
Not insane, -	44	20	64	44	20	64
Total, -	3,589	3,184	6,773	3,589	3,184	6,773

TABLE V.

NATIVITY OF PATIENTS ADMITTED.

NATIVITY.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Alabama,	—	—	—	—	—	—	2	1	3
California,	—	—	—	—	—	—	1	2	3
Connecticut,	90	69	159	102	58	160	1,882	1,391	3,273
Florida,	—	—	—	—	—	—	2	—	2
Georgia,	—	—	—	—	1	1	1	3	4
Illinois,	—	—	—	—	—	—	—	2	2
Indiana,	—	—	—	2	—	2	2	—	2
Iowa,	—	—	—	—	—	—	2	—	2
Kansas,	—	—	—	—	1	1	—	1	1
Kentucky,	—	—	—	—	—	—	2	—	2
Louisiana,	—	—	—	—	—	—	2	2	4
Maine,	—	1	1	1	1	2	13	9	22
Maryland,	—	—	—	1	1	2	6	6	12
Massachusetts,	5	3	8	13	2	15	108	71	179
Michigan,	—	—	—	—	—	—	3	2	5
New Hampshire,	1	—	1	1	1	2	8	4	12
New Jersey,	—	2	2	—	1	1	17	11	28
New York,	8	9	17	6	8	14	190	167	357
North Carolina,	—	—	—	1	—	1	11	1	12
Ohio,	1	—	1	1	1	2	3	6	9
Pennsylvania,	3	—	3	2	2	4	20	13	33
Rhode Island,	—	2	2	2	2	4	41	22	63
South Carolina,	—	—	—	—	—	—	2	1	3
Tennessee,	—	—	—	—	—	—	2	—	2
Texas,	—	—	—	—	—	—	—	1	1
Vermont,	1	2	3	—	1	1	17	13	30
Virginia,	1	—	1	2	1	3	16	15	31
Wisconsin,	—	—	—	1	—	1	1	—	1
Canada, Dominion of,	4	1	5	7	8	15	60	32	92
Bermuda,	—	—	—	—	—	—	1	—	1
Cuba,	—	—	—	—	—	—	1	5	6
Austria,	2	—	2	2	1	3	8	4	12
Denmark,	2	—	2	—	2	2	6	3	9
England,	5	8	13	6	2	8	124	113	237
France,	—	—	—	—	3	3	7	10	17
Germany,	8	10	18	15	12	27	181	186	367
Ireland,	29	52	81	33	30	63	690	962	1,652
Italy,	—	—	—	4	—	4	16	6	22
Norway,	—	—	—	—	—	—	3	2	5
Russia,	4	3	7	4	2	6	15	18	33
Scotland,	—	—	—	—	—	—	17	23	40
Spain,	—	—	—	2	—	2	5	—	5
Sweden,	4	5	9	3	3	6	47	46	93
Switzerland,	—	—	—	—	—	—	10	3	13
Wales,	—	—	—	—	—	—	5	—	5
West Indies,	—	—	—	—	—	—	—	1	1
Unknown,	1	2	3	2	1	3	39	26	65
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE VI.

RESIDENCE OF PATIENTS ADMITTED.

RESIDENCE.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
State at Large, - -	14	—	14	56	2	58	351	29	380
Hartford County, -	38	34	72	32	33	65	733	691	1,424
New Haven County, -	44	51	95	46	37	83	908	931	1,839
New London County,	12	15	27	20	17	37	329	323	652
Windham County, -	5	5	10	13	6	19	113	128	241
Litchfield County, -	7	7	14	7	8	15	179	191	370
Middlesex County, -	14	19	33	7	15	22	314	294	608
Tolland County, -	5	5	10	4	4	8	94	107	201
Fairfield County, -	30	33	63	28	23	51	558	488	1,046
Elsewhere, - - -	—	—	—	—	—	—	10	2	12
Total, - - -	169	169	338	213	145	358	3,589	3,184	6,773

TABLE VII.

OCCUPATION OF THOSE ADMITTED.

OCCUPATION.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Accountants,	4	—	4	4	—	4	35	—	35
Actors,	—	—	—	—	—	—	3	3	6
Agents,	2	—	2	4	—	4	45	—	45
Artists,	—	—	—	—	—	—	6	1	7
Brokers,	—	—	—	—	—	—	3	—	3
Clerks,	1	—	1	4	1	5	77	2	79
Clergymen,	—	—	—	—	—	—	14	—	14
Dentists,	—	—	—	1	—	1	6	—	6
Domestics,	—	26	26	—	17	17	—	585	585
Druggists,	2	—	2	—	—	—	16	—	16
Factory employés,	11	21	32	21	12	33	352	246	598
Farmers,	29	—	29	32	—	32	602	—	602
Fishermen,	2	—	2	—	—	—	9	—	9
Housekeepers,	—	9	9	—	8	8	—	198	198
Housewives,	—	66	66	—	54	54	—	1,300	1,300
Journalists,	—	—	—	—	—	—	4	—	4
Laborers,	37	—	37	46	—	46	837	—	837
Landlords,	—	—	—	2	—	2	4	—	4
Lawyers,	—	—	—	—	—	—	8	—	8
Machinists,	4	—	4	4	—	4	102	—	102
Manufacturers,	—	—	—	1	—	1	27	—	27
Mechanics,	11	—	11	13	—	13	415	—	415
Merchants,	—	—	—	2	—	2	83	1	84
Newsboys,	1	—	1	—	—	—	6	—	6
No employment,	19	37	56	18	35	53	240	570	810
Nurses,	—	1	1	—	2	2	—	10	10
Peddlers,	1	—	1	1	—	1	14	1	15
Physicians,	1	—	1	—	—	—	15	—	15
Railroad employés,	2	—	2	6	—	6	46	—	46
Sailors,	1	—	1	6	—	6	51	—	51
Saloon keepers,	2	—	2	1	—	1	24	1	25
Speculator,	—	—	—	—	—	—	1	—	1
Soldiers,	—	—	—	1	—	1	2	—	2
Students,	—	1	1	—	2	2	20	27	47
The trades,	36	5	41	39	7	46	404	113	517
Teachers,	1	2	3	—	2	2	19	81	100
Teamsters,	1	—	1	4	—	4	59	—	59
Telegraph operators,	—	—	—	—	—	—	3	—	3
Unknown,	—	1	1	2	5	7	28	45	73
Waiters,	1	—	1	1	—	1	9	—	9
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE VIII.

CIVIL CONDITION OF THOSE COMMITTED.

	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Single,	92	71	163	113	53	166	1,791	1,253	3,044
Married,	62	71	133	73	61	134	1,475	1,403	2,878
Widowed,	12	25	37	18	29	47	257	486	743
Unknown,	3	2	5	9	2	11	66	42	108
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE IX.

HOW COMMITTED.

	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
By Friends,	—	—	—	—	—	—	138	107	245
Probate Judges,	151	169	320	153	143	296	2,955	3,032	5,987
Judges of Superior Court,	5	—	5	14	—	14	169	13	182
Governor's Orders,	1	—	1	30	2	32	91	9	100
Soldiers' Hospital Board,	5	—	5	6	—	6	115	—	115
Justice or Police Courts,	3	—	3	5	—	5	92	21	113
Order of General Assembly,	—	—	—	—	—	—	1	1	2
County Commissioners,	4	—	4	5	—	5	28	1	29
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE X.

HOW SUPPORTED.

	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
By Self or Friends (paying),	—	1	1	—	—	—	150	110	260
State and Friends (indigent),	88	100	188	77	82	159	1,241	1,449	2,690
State and Town (pauper),	67	68	135	80	61	141	1,824	1,595	3,419
State alone,	14	—	14	56	2	58	374	30	404
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XI.

FORM OF DISEASE OF THOSE ADMITTED.

FORMS OF DISEASE.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Mania—Acute,	25	32	57	42	26	68	797	658	1,455
Sub-acute,	—	2	2	—	—	—	20	7	27
Chronic,	33	41	74	43	25	68	900	957	1,857
Melancholia—Acute,	24	31	55	36	21	57	499	543	1,042
Chronic,	17	17	34	20	19	39	255	247	502
Attonita,	—	—	—	1	—	1	7	7	14
Dementia—Acute,	1	—	1	—	1	1	26	20	46
Chronic,	3	15	18	8	12	20	162	170	332
Organic,	3	1	4	7	5	12	35	21	56
Epileptic Insanity,	11	3	14	7	3	10	197	103	300
Hysterical "	—	—	—	—	—	—	—	13	13
Neurasthenic "	—	—	—	—	—	—	2	2	4
Puerperal "	—	4	4	—	9	9	—	78	78
Recurrent "	9	4	13	11	7	18	69	91	160
Senile "	6	9	15	9	7	16	126	156	282
Toxic "	5	2	7	5	—	5	157	28	185
Paranoia,	11	—	11	5	1	6	59	8	67
General Paresis,	7	1	8	11	4	15	129	19	148
Imbecility,	13	5	18	7	4	11	105	36	141
Not Insane,	1	2	3	1	1	2	44	20	64
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XII.

COMPLICATIONS (OF NERVOUS SYSTEM) IN THOSE ADMITTED.

COMPLICATIONS.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Aphasia,	—	—	—	—	—	—	6	—	6
Apoplexy,	1	1	2	3	4	7	29	12	41
Chorea,	1	—	1	3	—	3	14	12	26
Epilepsy,	11	3	14	8	3	11	198	103	301
Hemiplegia,	1	1	2	3	2	5	18	17	35
Hysteria,	—	—	—	—	3	3	—	23	23
Hereditary tendency,	41	32	73	42	40	82	812	758	1,570
Neuritis alcoholic,	—	—	—	2	1	3	2	1	3
Paraplegia,	1	—	1	1	—	1	8	5	13
Paralysis agitans,	—	—	—	—	—	—	1	1	2
Pseudo-hypertrophic paralysis,	—	—	—	—	—	—	—	1	1
Progressive muscular atrophy	—	—	—	—	—	—	1	1	2
Spinal paralysis,	—	—	—	1	—	1	3	—	3
Syphilis,	3	2	5	1	1	2	17	19	36
Without complications,	110	130	240	149	91	240	2,480	2,231	4,711
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XIII.

NUMBER OF ATTACKS IN THOSE ADMITTED.

ATTACK.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
First,	131	127	258	168	110	278	2,659	2,480	5,139
Second,	15	17	32	16	16	32	329	351	680
Third,	4	7	11	4	1	5	92	109	201
Fourth,	3	2	5	5	3	8	42	41	83
Fifth,	1	—	1	—	1	1	17	25	42
Sixth,	—	1	1	—	—	—	12	12	24
Seventh,	—	—	—	—	—	—	7	6	13
Eighth,	1	—	1	1	—	1	2	8	10
Several,	4	—	4	2	—	2	70	22	92
Unknown,	9	13	22	16	13	29	315	110	425
Not insane,	1	2	3	1	1	2	44	20	64
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XIV.

DURATION OF INSANITY BEFORE ENTRANCE OF THOSE ADMITTED.

	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Less than 1 month, - -	18	18	36	16	14	30	449	435	884
1 to 3 months, - -	18	26	44	26	16	42	486	386	872
3 to 6 " - -	16	15	31	31	19	50	341	310	651
6 to 9 " - -	10	9	19	21	12	33	223	194	417
9 to 12 " - -	4	2	6	7	4	11	120	92	212
12 to 18 " - -	14	20	34	22	13	35	278	252	530
18 to 24 " - -	4	2	6	5	1	6	105	98	203
2 to 3 years, - -	19	11	30	17	10	27	310	272	582
3 to 5 " - -	13	13	26	14	13	27	286	312	598
5 to 10 " - -	18	15	33	13	16	29	287	318	605
10 to 15 " - -	3	12	15	10	4	14	148	149	297
15 to 20 " - -	5	4	9	5	5	10	77	79	156
20 to 25 " - -	6	1	7	3	3	6	47	41	88
25 to 30 " - -	4	1	5	2	—	2	38	22	60
30 and over, - - -	6	6	12	4	4	8	36	66	102
Unknown, - - -	10	12	22	16	10	26	314	138	452
Not insane, - - -	1	2	3	1	1	2	44	20	64
Total, - - -	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XV.

CAUSES OF INSANITY IN THOSE ADMITTED.

CAUSES ALLEGED.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Anxiety of mind,	2	1	3	1	—	1	145	69	214
Arsenic habit,	—	1	1	—	—	—	—	1	1
Abortion,	—	1	1	—	1	1	—	7	7
Apoplexy,	1	1	2	2	4	6	44	16	60
Cerebral tumor,	—	—	—	—	—	—	1	—	1
Cerebro-spinal meningitis,	—	—	—	—	—	—	—	8	8
Confinement,	—	—	—	—	—	—	16	—	16
Chloral habit,	—	1	1	—	—	—	—	1	1
Congenital defect,	12	2	14	3	4	7	46	13	59
Connected with the affections	3	3	6	2	9	11	91	190	281
Domestic difficulties,	2	—	2	4	2	6	30	97	127
Diabetes mellitus,	—	—	—	—	—	—	—	1	1
Dissipation,	2	—	2	2	—	2	12	11	23
Epilepsy,	11	3	14	6	3	9	183	102	285
Excessive venery,	1	—	1	—	—	—	21	1	22
Fluctuations of fortune,	1	—	1	7	2	9	57	27	84
Fevers,	—	3	3	1	1	2	16	17	33
Hysteria,	—	—	—	—	—	—	—	14	14
Ill health,	1	7	8	8	5	13	205	333	538
Influenza,	1	3	4	1	1	2	2	4	6
Injuries to head and spine,	6	—	6	7	2	9	89	14	103
Intemperance,	22	9	31	38	6	44	540	128	668
Masturbation,	6	1	7	7	2	9	169	31	200
Menopausis,	—	4	4	—	4	4	—	72	72
Menstruation, disorders of,	—	—	—	—	—	—	—	22	22
Meningitis,	—	—	—	—	—	—	—	3	3
Nervous shock,	—	—	—	—	—	—	9	10	19
Nostalgia,	—	—	—	—	—	—	4	7	11
Not insane,	1	2	3	1	1	2	44	20	64
Old age,	6	8	14	7	7	14	85	112	197
Over-study,	—	—	—	—	1	1	13	20	33
Opium habit,	—	1	1	—	1	1	10	12	22
Over-work,	3	7	10	2	3	5	91	116	207
Partial insolation,	3	—	3	4	1	5	49	4	53
Phthisis pulmonalis,	—	—	—	1	—	1	2	4	6
Puerperal state, pregnancy, etc.,	—	6	6	—	12	12	—	141	141
Religion,	—	—	—	1	1	2	43	63	106
Syphilis,	4	2	6	—	1	1	24	19	43
Tobacco,	—	—	—	—	—	—	11	—	11
Tuberculosis,	—	—	—	—	—	—	1	—	1
Uterine disease,	—	2	2	—	1	1	—	35	35
Starvation and privation,	—	—	—	—	—	—	1	10	11
Unknown,	81	101	182	108	70	178	1,535	1,429	2,964
Total,	169	169	338	213	145	358	3,589	3,184	6,773

TABLE XVI.

RECOVERED OF THOSE ATTACKED AT THE SEVERAL AGES SINCE THE OPENING OF THE HOSPITAL.

AGE WHEN ATTACKED.	Number Recovered.			Per Cent. Recovered.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 15, - -	—	3	3	—	5.17	1.56
15 to 20, - -	41	46	87	16.73	21.80	19.10
20 to 25, - -	100	102	202	22.88	24.94	23.87
25 to 30, - -	102	102	204	21.65	21.51	21.58
30 to 35, - -	111	90	201	26.61	22.90	24.81
35 to 40, - -	98	87	185	27.68	22.27	25.00
40 to 45, - -	72	72	144	25.26	25.17	25.39
45 to 50, - -	66	54	120	22.22	20.84	23.48
50 to 60, - -	71	85	156	20.94	28.23	24.37
60 to 70, - -	48	28	76	21.42	18.74	20.26
70 to 80, - -	8	6	14	9.30	7.14	8.23
Over 80, - -	2	1	3	12.50	4.00	7.31
Total, - -	719	676	1,395			

TABLE XVII.

RECOVERED AFTER VARIOUS DURATIONS OF DISEASE BEFORE TREATMENT SINCE THE OPENING.

DURATION.	Number Recovered.			Per Cent. Recovered.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 1 month, -	244	212	456	54.34	48.73	51.58
1 to 3 months, -	187	179	366	38.45	46.37	41.74
3 to 6 " -	99	113	212	29.03	36.45	32.56
6 to 9 " -	58	52	110	26.00	26.80	26.37
9 to 12 " -	37	21	58	30.83	22.82	27.35
1 to 2 years, -	44	52	96	11.48	14.85	13.09
2 to 3 " -	31	16	47	10.00	5.90	8.07
3 to 5 " -	11	16	27	3.84	5.12	4.68
5 to 10 " -	5	10	15	1.74	3.14	2.47
Over 10 " -	3	5	8	.86	1.20	.65
Total, - -	719	676	1,395			

TABLE XVIII.

DURATION OF TREATMENT OF THOSE RECOVERED SINCE THE OPENING.

DURATION.	NUMBER RECOVERED.		
	Males.	Females.	Total.
Under 1 month,	80	30	110
1 to 2 months,	135	79	214
2 to 3 "	117	120	237
3 to 6 "	171	199	370
6 to 9 "	83	81	164
9 to 12 "	49	50	99
12 to 18 "	40	46	86
18 to 24 "	8	22	30
2 to 3 years,	19	21	40
3 to 5 "	13	19	32
Over 5 "	4	9	13
Total,	719	676	1,395
Average duration of all,	6.57 + mos.	8.01 + mos.	7.40 + mos.

TABLE XIX.

DURATION OF DISEASE OF THOSE RECOVERED SINCE THE OPENING.

DURATION.	NUMBER RECOVERED.		
	Males.	Females.	Total.
Under 1 month,	38	13	51
1 to 2 months,	82	30	112
2 to 3 "	72	45	117
3 to 6 "	143	182	325
6 to 9 "	101	120	221
9 to 12 "	78	72	150
12 to 18 "	76	72	148
18 to 24 "	34	35	69
2 to 3 years,	50	40	90
3 to 5 "	30	36	66
Over 5 "	15	31	46
Total,	719	676	1,395
Average duration of all,	11.69 + mos.	13.99 + mos.	12.87 + mos.

TABLE XX.

FORM OF DISEASE OF THOSE RECOVERED SINCE THE OPENING.

DISEASE.	Number Recovered.			Per Cent. Recovered of Each Form Admitted.		
	Males.	Females.	Total.	Males.	Females.	Total.
Mania—Acute,	367	265	632	46.05	40.27	43.43
Sub-acute,	20	2	22	100.00	28.56	81.44
Chronic,	45	82	127	5.00	8.50	6.88
Melancholia—Acute,	181	182	363	36.27	33.51	34.83
Chronic,	41	55	96	15.68	22.29	19.11
Attonita,	—	1	1	—	14.28	7.14
Dementia—Acute,	4	5	9	15.38	25.00	19.50
Epileptic Insanity,	4	1	5	2.03	.97	1.86
Hysterical "	—	8	8	—	61.53	61.53
Neurasthenic "	1	2	3	50.00	100.00	75.00
Puerperal "	—	41	41	—	52.56	52.56
Recurrent "	25	25	50	36.23	27.47	31.25
Toxic "	31	7	38	19.74	25.92	20.65
Total,	719	676	1,395			

TABLE XXI.

CAUSES (EXCITING) OF DISEASE OF THOSE RECOVERED SINCE THE OPENING.

CAUSES.	Number Recovered.			Per Cent. Recovered of Each Form Admitted.		
	Males.	Females.	Total.	Males.	Females.	Total.
Abortion,	—	1	1	—	14.28	14.28
Anxiety of mind,	41	29	70	27.58	42.02	32.71
Connected with the affections,	34	50	84	37.36	26.31	29.89
Connected with fluctuations of fortune,	15	5	20	26.31	18.51	23.80
Connected with religion,	19	20	39	44.18	31.74	36.79
Domestic difficulties,	6	26	32	20.00	26.80	25.11
Epilepsy,	4	1	5	2.18	.98	1.75
Excessive venery,	5	—	5	23.80	—	22.72
Fevers,	2	2	4	12.50	11.82	12.12
Ill health,	51	88	139	24.87	26.42	25.83
Intemperance,	160	42	202	31.11	32.81	30.23
Injuries to nervous system,	18	6	24	20.22	42.85	23.30
Masturbation,	23	3	26	13.60	9.67	13.00
Menopausis,	—	10	10	—	13.88	13.88
Nostalgia,	—	1	1	—	14.28	14.28
Over-study,	2	3	5	15.38	15.00	15.15
Partial insolation,	4	—	4	8.16	—	3.77
Puerperal state, pregnancy, etc.	—	55	55	—	39.00	39.00
Tobacco,	4	—	4	36.36	—	36.36
Confinement,	10	—	10	62.50	—	62.50
Over-work,	23	32	55	21.97	27.58	26.57
Syphilis,	1	4	5	4.16	21.05	11.62
Opium,	1	3	4	10.00	25.00	18.18
Starvation and privation,	—	3	3	—	30.00	27.27
Unknown,	296	292	588	19.28	20.43	19.83
Total,	719	676	1,395			

TABLE XXII.

AGES AT DEATH.

AGE.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Under 15,	—	—	—	—	—	—	—	1	1
15 to 20,	—	2	2	1	—	1	10	10	20
20 to 25,	—	3	3	2	1	3	25	24	49
25 to 30,	3	7	10	4	—	4	45	36	81
30 to 35,	5	1	6	5	1	6	60	38	98
35 to 40,	2	4	6	3	3	6	90	70	160
40 to 45,	10	3	13	5	4	9	97	55	152
45 to 50,	7	5	12	6	6	12	87	72	159
50 to 60,	7	13	20	8	11	19	150	126	276
60 to 70,	10	7	17	12	7	19	155	103	258
70 to 80,	9	14	23	10	5	15	100	100	200
80 to 90,	4	2	6	3	4	7	44	48	92
Over 90,	—	—	—	—	—	—	1	9	10
Total,	57	61	118	59	42	101	864	692	1,556

TABLE XXIII.

DEATHS AND THE CAUSES.

CAUSES.	1892–93.			1893–94.			SINCE THE OPENING.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Abscess, lumbar,	—	—	—	—	—	—	—	1	1
Abscess, lungs,	—	—	—	—	—	—	1	—	1
Abscess, tonsils,	—	—	—	—	—	—	1	—	1
Aorta, aneurism of,	1	—	1	—	—	—	1	—	1
Arteritis, chronic (atheromatous),	2	2	4	—	1	1	13	4	17
Arteritis, chronic (osseous),	—	—	—	—	—	—	1	—	1
Arteritis, chronic (aneurismal),	—	—	—	—	—	—	1	1	2
Apoplexy,	4	8	12	5	5	10	79	60	139
Asphyxia,	—	—	—	—	—	—	—	1	1
Bright's disease, acute,	—	—	—	—	—	—	2	2	4
Bright's disease, chronic,	1	—	1	2	4	6	22	15	37
Bronchitis, capillary,	—	—	—	1	—	1	2	3	5
Carcinoma,	1	—	1	—	—	—	9	16	25
Carbuncle,	—	—	—	—	—	—	2	—	2
Cerebral atrophy,	—	—	—	—	—	—	1	3	4
Cerebral embolism,	—	—	—	—	—	—	4	—	4
Cerebral softening,	—	—	—	—	—	—	7	1	8
Chorea,	—	1	1	—	—	—	—	3	3

TABLE XXIII.—(Continued.)

DEATHS AND THE CAUSES.

CAUSES.	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Cystitis, chronic,	—	—	—	—	—	—	5	—	5
Diphtheria,	—	1	1	—	—	—	—	1	1
Drowning, accidental,	—	—	—	—	—	—	2	—	2
Diabetis mellitus,	1	—	1	—	—	—	1	1	2
Dysentery,	1	1	2	—	1	1	5	10	15
Epilepsy,	8	2	10	7	1	8	56	22	78
Empyema,	—	1	1	—	1	1	2	3	5
Enteritis,	—	1	1	1	1	2	11	21	33
Erysipelas,	1	3	4	—	—	—	24	8	32
Gangrene, lungs,	—	—	—	—	—	—	4	3	7
General paresis,	9	2	11	9	5	14	134	22	156
Hemorrhage, uterine,	—	—	—	—	—	—	—	2	2
Heart, hypertrophy of,	—	—	—	—	—	—	1	—	1
Heart, paralysis of,	—	—	—	—	—	—	6	5	11
Heart, rupture of,	—	—	—	1	—	1	2	—	2
Heart, valvular disease of,	7	4	11	10	4	14	49	29	78
Heart, fatty degeneration of,	—	1	1	—	—	—	5	5	10
Hernia, strangulated,	—	—	—	—	—	—	1	2	3
Intestinal obstruction,	—	1	1	—	—	—	1	1	2
Injuries from fall,	1	—	1	—	—	—	4	—	4
Leucocythaemia,	—	—	—	—	—	—	—	1	1
Liver, cirrhosis of,	1	—	1	—	—	—	4	3	7
Liver, fatty degeneration of,	—	—	—	—	—	—	1	1	2
Lung, oedema of,	—	—	—	—	—	—	1	1	2
Lymphadenoma,	—	—	—	—	—	—	—	1	1
Mania, acute, exhaustion from,	1	1	2	1	—	1	39	33	72
Mania, chronic, " "	—	1	1	—	1	1	43	46	89
Melancholia, " "	2	3	5	2	1	3	19	27	46
Marasmus,	—	2	2	2	1	3	17	25	42
Meningitis,	1	—	1	—	—	—	10	4	14
Osteorathritis,	—	—	—	—	—	—	1	—	1
Paralysis, exhaustion from,	1	—	1	4	—	4	11	2	13
Phthisis, catarrhal,	8	11	19	8	10	18	99	131	230
Phthisis, tubercular,	—	1	1	1	—	1	9	11	20
Phlebitis,	—	—	—	—	—	—	—	1	1
Pleuritis,	—	—	—	—	—	—	6	1	7
Pneumonia,	4	5	9	4	—	4	43	28	71
Peritonitis, acute,	2	—	2	—	1	1	7	4	11
Peritonitis, chronic,	—	—	—	—	—	—	1	1	2
Pyaemia,	—	—	—	—	—	—	3	1	4
Pyonephrosis,	—	—	—	—	—	—	—	1	1
Senility,	—	9	9	—	5	5	53	100	153
Septicaemia,	—	—	—	1	—	1	1	1	2
Shock from injuries,	—	—	—	—	—	—	—	1	1
Strangulation from food,	—	—	—	—	—	—	4	—	4
Suicide,	—	—	—	—	—	—	14	11	25
Syphilis,	—	—	—	—	—	—	5	2	7
Sclerosis, spinal,	—	—	—	—	—	—	1	—	1

TABLE XXIII.—(Continued.)

DEATHS AND THE CAUSES.

CAUSES.	1892–93.			1893–94.			Since the Opening.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Sclerosis, diffused cerebral,	—	—	—	—	—	—	—	1	1
Tetanus,	—	—	—	—	—	—	1	—	1
Tonsillitis,	—	—	—	—	—	—	—	1	1
Tumor, cerebral,	—	—	—	—	—	—	2	—	2
Tumor, ovarian,	—	—	—	—	—	—	—	1	1
Tumor, uterine,	—	—	—	—	—	—	—	1	1
Undetermined,	—	—	—	—	—	—	6	4	10
Ulceration of gall bladder,	—	—	—	—	—	—	1	—	1
Violence,	—	—	—	—	—	—	3	1	4
Total,	57	61	118	59	42	101	864	692	1,556

TABLE XXIV.

DURATION OF INSANITY OF THOSE WHO DIED SINCE THE OPENING OF THE HOSPITAL.

DURATION.	From Admission Into the Hospital.			From the Attack.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 1 month,	114	70	184	14	16	30
1 to 2 months,	71	36	107	24	20	44
2 to 3 "	69	23	92	21	7	28
3 to 6 "	86	61	147	33	27	60
6 to 9 "	63	46	109	39	18	57
9 to 12 "	56	26	82	30	15	45
12 to 18 "	81	60	141	77	24	101
18 to 24 "	27	40	67	54	41	95
2 to 3 years,	68	66	134	88	82	170
3 to 5 "	69	88	157	118	87	205
5 to 10 "	92	99	191	117	132	249
10 to 15 "	40	44	84	75	70	145
15 to 20 "	19	25	44	39	46	85
20 to 25 "	9	8	17	35	29	64
25 to 30 "	—	—	—	16	18	34
30 to 40 "	—	—	—	15	22	37
40 to 50 "	—	—	—	7	13	20
Unknown,	—	—	—	62	25	87
Total,	864	692	1,556	864	692	1,556
Average of all,	34.18 months.	46.85 months.	40.14 months.	6.88 years.	9.99 years.	7.23 years.

TABLE XXV.

REMAINING AT THE END OF THE YEAR.

AGE.	Males.	Females.	Total.
Under 15,	1	2	3
15 to 20,	10	6	16
20 to 25,	36	26	62
25 to 30,	67	50	117
30 to 35,	113	85	198
35 to 40,	110	104	214
40 to 45,	105	98	203
45 to 50,	77	106	183
50 to 60,	143	186	329
60 to 70,	55	106	161
70 to 80,	33	51	84
80 to 90,	2	6	8
Over 90,	1	1	2
Total,	753	827	1,580

TABLE XXVI.

REMAINING AT THE END OF THE YEAR.—DURATION OF THE DISEASE.

DURATION.	Since Admission.			Since the Attack.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 1 month,	17	12	29	1	—	1
1 to 2 months,	13	13	26	2	1	3
2 to 3 "	17	4	21	4	5	9
3 to 6 "	41	27	68	7	13	20
6 to 9 "	27	26	53	16	6	22
9 to 12 "	24	30	54	10	9	19
12 to 18 "	42	43	85	27	26	53
18 to 24 "	38	35	73	28	16	44
2 to 3 years,	64	71	135	47	53	100
3 to 5 "	115	109	224	97	80	177
5 to 10 "	185	224	409	134	176	310
10 to 15 "	103	140	243	133	157	290
15 to 20 "	43	43	86	67	101	168
20 to 25 "	15	32	47	50	54	104
25 to 30 "	9	18	27	26	33	59
30 to 40 "	—	—	—	23	34	57
Over 40 "	—	—	—	12	18	30
Unknown,	—	—	—	69	45	114
Total,	753	827	1,580	753	827	1,580

TABLE XXVII.—Census Each Year Since the Opening of the Hospital.

PATIENTS.		Year Ending March 31, 1869.	Year Ending March 31, 1870.	Year Ending March 31, 1871.	Year Ending March 31, 1872.	Year Ending March 31, 1873.	Year Ending March 31, 1874.	Year Ending March 31, 1875.	Year Ending March 31, 1876.	Period Ending Nov. 30, 1876.	Year Ending Nov. 30, 1877.	Year Ending Nov. 30, 1878.	Year Ending Nov. 30, 1879.	Year Ending Nov. 30, 1880.	Year Ending Nov. 30, 1881.	Year Ending Nov. 30, 1882.	Year Ending Nov. 30, 1883.	Year Ending Nov. 30, 1884.	Period Ending June 30, 1885.	Year Ending June 30, 1886.	Year Ending June 30, 1887.	Year Ending June 30, 1888.	Year Ending June 30, 1889.	Year Ending June 30, 1890.	Year Ending June 30, 1891.	Year Ending June 30, 1892.	Year Ending June 30, 1893.	Year Ending June 30, 1894.	Total.
Admitted—Males,		165	78	49	56	43	93	122	108	59	92	101	75	73	193	177	135	121	103	175	182	193	193	197	234	190	169	213	3589
Females,		103	56	26	36	31	160	88	58	29	61	60	88	71	159	171	136	122	106	186	193	202	193	171	188	176	169	145	3184
Total,		268	134	75	92	74	253	210	166	88	153	161	163	144	352	348	271	243	209	361	375	395	386	368	422	366	338	358	6773
Discharged. *Recovered*—Males,		25	27	14	11	8	16	24	33	12	26	20	18	11	33	39	26	26	13	25	35	49	39	36	44	28	42	39	719
Females,		—	16	6	6	3	21	17	12	6	15	12	27	19	20	42	46	26	15	48	52	51	46	39	41	34	32	24	676
Total,		25	43	20	17	11	37	41	45	18	41	32	45	30	53	81	72	52	28	73	87	100	85	75	85	62	74	63	1395
Improved—Males,		11	8	14	7	8	9	19	23	21	24	26	20	15	16	17	17	12	6	14	31	39	29	44	31	29	21	41	552
Females,		—	10	5	4	5	20	25	23	11	20	14	13	14	4	17	25	13	8	15	24	26	27	26	28	31	20	27	455
Total,		11	18	19	11	13	29	44	46	32	44	40	33	29	20	34	42	25	14	29	55	65	56	70	59	60	41	68	1007
Stationary—Males,		6	17	8	14	11	13	14	18	12	20	21	23	26	25	31	35	28	16	38	35	43	51	57	40	29	34	32	701
Females,		—	10	6	10	9	15	20	14	5	14	15	14	11	8	12	24	20	16	17	19	34	51	21	24	58	42	49	534
Total,		6	27	14	24	20	28	34	32	17	34	36	37	37	33	43	59	48	32	55	54	77	102	78	64	87	76	81	1235
Died—Males,		14	18	11	9	12	18	21	26	9	19	27	9	16	32	47	44	34	19	37	41	57	45	48	49	87	57	59	864
Females,		1	3	10	6	9	17	18	7	6	12	13	10	14	12	32	27	21	20	40	40	48	53	57	48	58	61	42	692
Total,		15	21	21	15	21	35	36	33	15	31	40	19	30	44	79	80	55	39	77	81	105	98	105	97	145	118	101	1556
Whole number in the year,		268	343	307	329	336	524	605	616	548	619	629	644	654	880	1079	1113	1103	1132	1380	1521	1639	1678	1705	1799	1860	1844	1893	—
Number at end of the year,		209	232	237	262	271	395	450	460	466	468	481	510	528	731	842	860	929	1019	1146	1244	1292	1337	1377	1494	1506	1535	1580	—

TABLE XXVIII.

ADMISSIONS AND DISCHARGES.—RATIO PER CENT.

	1892–93.	1893–94.	Since the Opening.
Admission from causes:			
Anxiety of mind and over-study,	.88	.55	3.64
Apoplexy,	.59	1.64	.88
Connected with the affections,	1.77	3.07	4.14
Connected with fluctuations of fortune,	.29	2.51	1.23
Connected with religion,	—	.55	1.56
Epilepsy,	4.11	2.51	4.20
Ill health,	2.36	3.60	7.78
Intemperance,	9.14	12.26	9.98
Masturbation,	2.06	2.51	2.95
Old age,	4.11	3.91	2.90
Puerperal,	1.77	3.35	2.08
Unknown,	53.84	49.71	43.74
Recovered of all cases admitted:			
Under one year,	32.97	25.69	31.81
One year and over,	10.39	9.73	10.94
Deaths of all under care,	6.39	5.33	22.97
Deaths of average number in Hospital,	7.81	6.94	7.41

TREASURER'S REPORT.

Annual Statement of the Treasurer of the Connecticut Hospital for the Insane, for the Year Ending June 30th, 1893.

RECEIPTS.

Balance of cash on hand July 1st, 1892,	$60,064 68
Amount of revenue from Hospital orders in July,	32,346 00
" " " " " " August,	18,546 02
" " " " " " September,	8,376 28
" " " " " " October,	34,894 84
" " " " " " November,	15,024 08
" " " " " " December,	13,731 39
Six months' interest on balance in Middletown National Bank,	1,484 72
Six months' interest on Sargent Fund ($1,000),	20 00
Amount of revenue from Hospital orders in January, 1893,	80,338 98
" " " " " " February, "	14,687 84
" " " " " " March, "	12,113 01
" " " " " " April, "	32,664 42
" " " " " " May, "	16,301 26
" " " " " " June, "	10,102 85
Six months' interest on balance in Middletown National Bank,	1,702 29
Six months' interest on Sargent Fund,	20 00
	$352,418 66

DISBURSEMENTS.

Amount of Superintendent's orders paid in July, 1892,	$20,900 00
" " " " August,	27,514 19
" " " " September,	17,510 40
" " " " October,	19,446 78
" " " " November,	16,449 49
" " " " December,	19,865 78
" " " " January, 1893,	19,342 95
" " " " February, "	18,181 28
" " " " March, "	13,567 30
" " " " April, "	17,396 14
" " " " May, "	16,742 52
" " " " June, "	21,666 42
Balance deposited in Middletown National Bank,	123,835 41
	$352,418 66

M. B. COPELAND, *Treasurer.*

We hereby certify that we have examined the accounts of M. B. Copeland, Treasurer of the Connecticut Hospital for the Insane, from July 1, 1892, to June 30, 1893, inclusive, (Hospital fiscal year,) compared them with the vouchers and found the same correct. The balance in the hands of the Treasurer on said date was one hundred and twenty-three thousand eight hundred and thirty-five dollars and forty-one cents ($123,835.41), which includes the sum of forty-four thousand and two hundred dollars ($44,200.00), the special appropriation mentioned in the report of June 30, 1892.

E. LIVINGSTON WELLS,
OSCAR LEACH, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., Feb. 3, 1894.

TREASURER'S REPORT.

Annual Statement of the Treasurer of the Connecticut Hospital for the Insane, for the Year Ending June 30, 1894.

RECEIPTS.

Balance of account as rendered July 1, 1893,	$123,835 41
Amount of revenue in July,	35,169 98
" " August,	13,770 93
" " September,	10,464 70
" " October,	27,669 03
" " November,	12,702 49
" " December,	16,198 49
Amount of interest received on Sargent Fund ($1,000),	20 00
Six months' interest on bank deposit,	1,621 86
Amount of revenue in January, 1894,	40,810 98
" " February,	14,299 91
" " March,	9,612 43
" " April,	33,472 04
" " May,	13,966 91
" " June,	12,844 54
Amount of interest received on Sargent Fund,	20 00
Six months' interest on bank deposit,	1,588 18
	$370,067 88

DISBURSEMENTS.

Amount of Superintendent's orders paid in July, 1893,	$16,395 47
" " " " August,	43,607 71
" " " " September,	21,237 05
" " " " October,	17,558 07
" " " " November,	19,514 60
" " " " December,	21,712 79
" " " " January, 1894,	25,662 89
" " " " February,	13,288 59
" " " " March,	15,914 20
" " " " April,	15,628 95
" " " " May,	26,736 17
" " " " June,	77,011 62
Balance of cash on hand June 30, 1894,	55,799 77
	$370,067 88

M. B. COPELAND, *Treasurer.*

MIDDLETOWN, CONN., July 2, 1894.

We hereby certify that we have examined the accounts of M. B. Copeland, Treasurer of the Connecticut Hospital for the Insane, from July 1, 1893, to June 30, 1894, inclusive, (Hospital fiscal year,) compared them with the vouchers and found the same correct. The balance in the hands of the Treasurer on said date was fifty-five thousand seven hundred and ninety-nine dollars and seventy-seven cents ($55,799.77).

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., Dec. 18, 1894.

SUPERINTENDENT'S FINANCIAL REPORT.

June 30th, 1893.

DEBTOR.

July 1, 1892—Cash on hand,		$198 40	
" " Balance with Treasurer,		59,893 16	
June 30, 1893—Revenue for the year,		247,923 52	
Special appropriation transferred,		44,200 00	
			$352,215 08

CREDIT.

July 31, 1892—By paid vouchers,		$20,814 95	
Aug. 31, " " "		27,859 15	
Sept. 30, " " "		18,155 74	
Oct. 31, " " "		18,156 07	
Nov. 30, " " "		17,075 80	
Dec. 31, " " "		19,845 80	
Jan. 31, 1893, " "		20,322 44	
Feb. 28, " " "		17,445 21	
Mar. 31, " " "		14,246 25	
Apr. 30, " " "		16,139 02	
May 31, " " "		16,607 01	
June 30, " " "		23,208 06	
" " Balance with Treasurer,		121,825 71	
" " Cash on hand,		513 87	
			$352,215 08

OUTSTANDING ORDERS ON TREASURER.

No. 12,693,	$7 38	No. 23,424,	$100 00	No. 23,688,	$132 05
No. 18,662,	46	No. 23,502,	100 00	No. 23,690,	31 30
No. 20,806,	8 59	No. 23,598,	100 00	No. 23,691,	25 50
No. 21,209,	4 57	No. 23,600,	100 00	No. 23,692,	128 00
No. 22,160,	3 80	No. 23,682,	108 11	No. 23,693,	48 10
No. 23,041,	4 49	No. 23,684,	73 97	No. 23,697,	93 00
No. 23,043,	6 21	No. 23,685,	91 89	No. 23,699,	181 50
No. 23,343,	100 00	No. 23,687,	432 47	No. 23,701,	81 61
				No. 23,702,	46 70
Total,					$2,009 70

We hereby certify that we have examined the accounts of the Superintendent of the Connecticut Hospital for the Insane, from July 1, 1892, to June 30, 1893, inclusive, (Hospital fiscal year,) compared them with the vouchers and found the same correct. The balance in the hands of the Superintendent on said date was five hundred and thirteen dollars and eighty-seven cents ($513.87).

E. LIVINGSTON WELLS, } *Auditors of*
OSCAR LEACH, } *Public Accounts.*

MIDDLETOWN, CONN., Feb. 3, 1894.

SUPERINTENDENT'S FINANCIAL REPORT.

June 30th, 1894.

DEBTOR.

July 1, 1893—Cash on hand,		$513 87	
" " Balance with Treasurer,		121,825 71	
June 30, 1894—Revenue for year,		246,232 47	
			$368,572 05

CREDIT.

July 31, 1893—Paid vouchers,		$16,037 38	
Aug. 31, " " "		42,310 08	
Sept. 30, " " "		21,459 17	
Oct. 31, " " "		18,016 42	
Nov. 30, " " "		20,266 67	
Dec. 31, " " "		20,267 11	
Jan. 31, 1894, " "		25,469 47	
Feb. 28, " " "		14,192 71	
Mar. 31, " " "		15,000 74	
Apr. 30, " " "		16,008 46	
May 31, " " "		26,387 31	
June 30, " " "		77,093 25	
" " Balance with Treasurer,		55,757 07	
" " Cash on hand,		306 21	
			$368,572 05

OUTSTANDING ORDERS ON TREASURER.

No. 12,693,	$7 38
No. 18,662,	46
No. 20,806,	8 59
No. 21,209,	4 57
No. 22,160,	3 80
No. 23,041,	4 49
No. 23,043,	6 21
No. 24,785,	4 20
No. 24,737,	3 00
	$42 70

We hereby certify that we have examined the accounts of the Superintendent of the Connecticut Hospital for the Insane, from July 1, 1893, to June 30, 1894, inclusive, (Hospital fiscal year,) compared them with the vouchers and found the same correct. The balance in the hands of the Superintendent on said date was three hundred and six dollars and twenty-one cents ($306.21).

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., Dec. 18, 1894.

Abstract of Vouchers for the Year Ending June 30th, 1893.

MONTH.	Salaries of Officers.	Pay of Employés.	Furniture and Fixtures.	Fuel and Lights.	Dry Goods and Clothing.	Stationery, Books, and Postage.	Provisions.	Fish.	Flour.	Meat.	Groceries.	Farm and Garden.	Construction.	Drugs.	Burial.	Refunded.	Repairing.	Insurance.	Miscellaneous.	Supplies.	Total.
ly, 1892,	$1087.14	$4672.26	$483.75	$6546.25	$1060.20	$104.42	$2434.60	$366.80	$10.55	$1345.51	$871.66	$244.78	$37.50	$234.09	$10.25	$141.23	$597.51	$206.14	$189.44	$170.87	$20814.95
g., "	1089.14	4633.09	211.35	8487.62	1073.13	89.80	3170.04	689.95	670.65	1985.22	948.68	134.89	3487.00	158.93	15.25	165.41	451.28	7.50	175.76	214.46	27859.15
pt., "	1075.16	4748.83	74.00	2006.22	842.24	214.06	2884.69	410.62	690.80	2026.00	643.08	622.73	800.00	153.31	15.00	78.56	482.94	—	105.39	282.11	18155.74
t., "	1081.29	4760.01	223.96	14.00	1062.45	88.87	2870.74	413.71	1987.75	1365.26	536.73	301.39	915.07	131.67	31.75	81.95	655.63	312.00	885.19	436.65	18156.07
ov., "	1097.48	4863.01	298.39	65.67	1421.28	107.42	2515.28	843.17	—	1889.71	684.46	507.02	828.86	256.36	15.25	152.19	890.52	—	214.16	426.17	17075.80
ec., "	1095.48	4754.55	39.89	1202.10	359.89	150.36	4147.60	1148.87	—	1669 69	628.00	1247.38	2241.48	37.09	——	68.08	648.04	—	165.14	242.16	19845.80
n., 1893,	1095.48	4821.05	547.07	—	1370.01	158.90	3922.06	552.58	1430.50	2184.11	542.72	1118.43	977.45	56.24	10.85	85.47	722.33	—	428.64	298.55	20322.44
b., "	1095.48	4771.72	289.01	—	1710.09	174.75	4270.33	387.18	559.00	1277.92	904.26	696.43	—	314.48	30.50	181.50	581.11	—	124.18	77.27	17445.21
ar., "	1095.48	4734.89	406.14	1272.12	196.65	355.25	1810.78	377.48	—	1811.43	112.86	622.76	99.00	234.59	11.10	42.56	454.81	—	180.78	427.57	14246.25
pril, "	1095.48	4760.05	390.83	54.00	858.63	68.99	2392.47	474.43	508.61	2136.66	945.67	1256.27	—	60.76	11.45	9.21	558.91	93.70	278.09	184.81	16139.02
ay, "	1105.81	4708.83	211.48	—	519.65	104.40	1968.05	646.18	1620.00	1872.05	1149.46	1352.35	213.83	248.85	22.25	59.90	271.61	93.70	146.73	291.88	16607.01
ne, "	1101.81	4729.55	427.79	2845.11	1153.60	96.89	3396.18	934.43	—	2093.12	3073.41	1069.64	95.65	426.63	30.50	71.26	767.20	93.70	173.28	628.31	23208.06
Total,	13115.23	56957.84	3603.66	22493.09	11627.82	1714.11	35782.82	7245.40	7477.86	21656.68	11040.99	9174.07	9695.24	2313.00	204.15	1137.32	7081.89	806.74	3066.78	3680.81	229875.50

Abstract of Vouchers for the Year Ending June 30th, 1894.

MONTH.	Salaries of Officers.	Pay of Employés.	Furniture and Fixtures.	Fuel and Lights.	Dry Goods and Clothing.	Stationery, Books, and Postage.	Provisions.	Fish.	Flour.	Meat.	Groceries.	Farm and Garden.	Construction.	Drugs.	Burial.	Refunded.	Repairing.	Insurance.	Miscellaneous.	Supplies.	
July, 1893,	$1103.81	$4713.05	$867.59	$1561.01	$176.85	$250.09	$2002.15	$336.43	—	$1462.53	$625.58	$698.60	$813.77	$37.61	—	$132.80	$849.26	$187.40	$173.9[illegible]	$44.8[illegible]	$1[illegible]
Aug., "	1105.81	4718.47	358.56	9346.67	771.81	69.20	2054.34	851.15	$1530.00	2907 55	1150.47	241.76	15723.48	78.94	—	25.80	512.18	—	446.82	417.07	42
Sept., "	1101.81	4707.82	171.98	5839.11	1330.19	72.01	2909.37	270.62		1199.23	1218.26	694.15	512.60	169.27	$10.25	32.00	532.15	22.50	150.[illegible]	515.04	21
Oct., "	1103.81	4680.34	78.53	—	428.88	105.87	3070.34	419.40	—	2102.73	1057.06	1992.41	1096.25	66.22	10.50	52.40	1240.00	—	247.97	263.71	18
Nov., "	1105.81	4788.32	868.72	151.36	984.67	65.23	1388.72	1764.29	4.50	1978.58	1028.83	1371.90	2488.90	197.77	15.25	127.25	1307.16	—	252.64	376.77	20
Dec., "	1103.81	4830.04	302.64	773.55	1723.78	55.69	3154.58	477.59	—	2288.18	1493.54	792.91	1529.76	53.73	36.25	12.00	1061.63	187.40	221.08	168.95	20
Jan., 1894,	1103.81	4858.04	100.23	—	882.23	224.96	2604.67	462.92	2071.85	1333.47	473.00	894.33	8575.47	39.32	10.50	12.80	809.92	591.17	273.15	147.63	25
Feb., "	1112.14	4922.82	656.83	—	277.76	107.13	2477.09	426.27	547.50	1154.29	564.88	150.23	—	308.05	—	27.40	1146.12	—	153.18	161.62	14
Mar., "	1112.14	4897.27	567.14	1103.25	887.13	136.99	1810.75	399.21	—	1689.01	994.07	462.40	—	180.65	25.75	284.57	221.30	—	208.41	20.70	15
April, "	1062.14	4880.15	252.80	—	759.81	133.68	2113.65	538.19	825.00	1600.16	1167.24	1361.44	—	73.48	20.50	61.15	685.40	—	146.64	327.03	16
May, "	1141.64	4849.94	690.48	—	233.51	83.00	2100.19	765.72	509.90	1324.59	1230.72	1173.30	10983.46	74.08	10.25	68.75	436.04	291.88	393.64	26.22	26
June, "	1162.14	4899.81	409.09	7806.13	1398.93	58.13	2072.68	630.27	517.50	2339.84	1064.66	1031.19	52365.54	268.47	21.57	67.50	632.96	56.22	150.02	140.60	77
Total,	13318.87	57746.07	5324.59	26581.08	9855.55	1361.98	27758.53	7342.06	6006.25	21380.16	12068.31	10864.62	94089.23	1547.59	160.82	904.42	9434.12	1336.57	2818.32	2609.63	312

FARMER'S REPORT,

FOR THE YEARS ENDING JUNE 30, 1893, AND JUNE 30, 1894.

	1893.		1894.	
PRODUCTS.	QUANTITY.	VALUE.	QUANTITY.	VALUE.
Hay,	210 tons,	$3,150.00	245 tons,	$3,340.00
Ensilage,	180 "	720.00	210 "	840.00
Potatoes,	3,525 bush.,	2,467.50	2,860 bush.,	1,716.00
Carrots,	41 "	16.40	60 "	24.00
Beets,	1,400 "	560.00	1,800 "	750.00
Beet Greens,	250 "	75.00	210 "	63.00
Onions,	525 "	472.50	615 "	430.50
Turnips,	750 "	225.00	740 "	222.00
Kale,	150 "	45.00	350 "	105.00
Beans (string),	225 "	225.00	205 "	205.00
Beans (in shell),	280 "	280.00	310 "	310.00
Peas,	220 "	220.00	280 "	280.00
Parsnips,	290 "	145.00	325 "	162.50
Sweet Corn,	895 "	492.25	350 "	742.50
Cucumbers,	365 "	292.00	390 "	312.00
Tomatoes,	230 "	161.00	355 "	248.50
Radishes,	15 "	15.00	20 "	20.00
Currants,	4 "	12.00	3 "	9.00
Apples,	225 "	112.50	260 "	156.00
Cider,	62 bbls.,	186.00	49 bbls.,	147.00
Lettuce,	800 heads,	16.00	1,300 heads,	26.00
Cabbage,	12,000 "	480.00	12,000 "	420.00
Celery,	8,000 "	240.00	8,000 "	240.00
Melons,	9,000 lbs.,	90.00	—	—
Veal,	867 "	86.70	347 lbs.,	34.70
Beef,	7,240 "	434.50	7,816 "	468.96
Pork,	39,684 "	3,174.72	37,964 "	2,657.48
Squash,	36,550 "	365.50	23,400 "	234.00
Milk (grass fed),	98,775 quarts,	3,951.00	98,700 quarts,	3,948.00
Pigs (sold),	15	65.00	96	364.50
Calves (sold),	27	55.00	35	70.00
		$18,830.57		$18,546.64

The farm stock consists of 73 cows, 20 young cattle, 18 horses, 144 hogs and 150 shotes.

P. W. SANDERSON, *Farmer.*

Sewing Room Report.

Articles.	1892–93.	1893–94.	Total.
Aprons,	358	486	844
Bed-spreads,	189	266	455
Bed-ticks,	15	18	33
Blankets, hemmed,	396	634	1,030
Bureau-covers,	6	47	53
Chemises,	642	704	1,346
Clothes bags,	53	65	118
Curtains,	186	194	380
Dresses,	702	742	1,444
Dresses, night,	27	110	137
Drawers, pairs,	122	256	378
Holders,	590	108	698
Napkins,	161	313	474
Pillow-slips,	1,332	1,921	3,253
Sheets,	1,481	1,473	2,954
Shirts,	846	530	1,376
Skirts,	226	289	515
Sacques,	24	23	47
Table-cloths,	73	96	169
Towels,	1,640	1,909	3,549
Underwaists,	25	13	38

Making carpets, mending clothing and bedding, etc.

MARGARET DUTTON, *Matron.*

WORKSHOP REPORT.

	1892–93.	1893–94.	Total.
Brooms,	1,496	1,400	2,896
Brooms, whisk,	115	96	211
Brushes, scrubbing,	259	387	646
Brushes, bathing,	23	—	23
Brushes, horse,	9	29	38
Bed-mats,	118	—	118
Chairs, caned or rattanned,	246	229	475
Chairs, upholstered,	—	12	12
Couches, upholstered,	8	12	20
Canvas dresses,	13	35	48
Camisoles,	26	13	39
Canvas mittens, (pairs)	6	—	6
Combination suits,	35	36	71
Cushions, carriage,	—	5	5
Cushions, chair,	5	—	5
Hassocks,	13	5	18
Mattresses,	179	231	410
Overalls,	258	237	495
Pillows,	288	275	563
Pants (pairs),	6	16	22
Suspenders (pairs),	298	338	636
Shoes (pairs),	16	10	26

Repairing of men's suits, of boots, shoes and slippers, of harness, clocks, etc.

C. H. CURTIS, *Foreman.*

Bill of Fare.

(FOR PATIENTS AND EMPLOYÉS.)

SUNDAY.

Breakfast.—In winter, crackers and stewed oysters; in summer, boiled eggs.

Dinner.—Cold corned beef; potatoes, pickled beets or an equivalent vegetable; pie.

Supper.—Sauce or fruit; cake.

MONDAY.

Breakfast.—Beefsteak; potatoes.

Dinner.—Meat soup with vegetables; boiled rice.

Supper.—Warm biscuits; sauce or fruit.

TUESDAY.

Breakfast.—Corned beef hash.

Dinner.—Roast pork or boiled ham or shad or clam chowder; potatoes and some other vegetable; pudding (tapioca).

Supper.—Hominy or oatmeal mush and syrup; ginger cookies.

WEDNESDAY.

Breakfast.—Pickled salmon or swordfish or tripe; potatoes.

Dinner.—Roast beef; potatoes; onions; pie.

Supper.—Crackers or biscuits; cheese; fresh graham bread.

THURSDAY.

Breakfast.—Sausages or eggs or ham; potatoes.

Dinner.—Meat and vegetable stew with dumplings. (For workers, roast mutton and vegetables.) Bread pudding.

Supper.—Sauce; doughnuts or sugar cookies.

FRIDAY.

Breakfast.—Stewed codfish; potatoes.

Dinner.—Soup; fresh fish (baked); potatoes and some other vegetable; pie.

Supper.—Dried beef; fresh gingerbread.

SATURDAY.

Breakfast.—Baked beans; brown bread.

Dinner.—Corned beef; potatoes; cabbage; pudding (rice).

Supper.—Cornmeal mush with syrup.

Bread and butter served with every meal. Coffee with every breakfast. Tea with every supper.

Special diet prescribed for the sick, such as oatmeal or flour gruels; dry or milk toast; eggs, boiled, raw or on toast; beef-tea and crackers; milk.

ADMISSION OF PATIENTS.

1. Whenever a patient is sent to the Hospital by order of the Probate Court, the order or warrant or a copy thereof, by which the person is sent, shall be lodged with the Superintendent.

2. It is expected that each patient, before admission, shall be made perfectly clean, and be free from vermin, or any contagious or infectious disease.

3. Each male patient should be provided with at least two shirts, one woolen coat, one woolen vest, one pair woolen pantaloons, two pair new socks, one pair new shoes or boots, and one comfortable outside garment.

Each female patient should, in addition to a quantity of under-clothing, shoes and stockings corresponding to that required by the male patient, have one flannel petticoat, two good dresses, one cloak or other good outside garment. Extra and better apparel is very desirable for Chapel worship and out-of-door exercise and riding.

4. In all cases the patient's best clothing should be sent; it will be carefully preserved, and only used when deemed necessary, for the purpose above mentioned. Jewelry, and all superfluous articles of dress, knives, etc., should be left at home, as they are liable to be lost, and for them the officers of the Hospital are not responsible.

5. A written history of the case should be sent with the patient, and, if possible, some one acquainted with the individual should accompany him to the Hospital, from whom minute, but often essential, particulars may be learned.

6. The price of board, including washing, mending, and attendance, for all who are supported at the public charge, is $2.80 per week.

7. Pauper patients, or those supported partly by the towns in which they reside, and partly by the State, are admitted agreeably to Section 487, General Statutes, 1888.

8. Indigent persons, or those possessing little property, and partly supported by friends and partly by the State, are admitted under Section 487, General Statutes, 1888.

9. Private patients, or those supported by themselves or friends, are admitted to the Hospital, when there are vacancies, under Chapter 162, Public Acts, 1889.

10. A bond with satisfactory surety, one or more, will be required with each indigent and private patient for the payment of expenses of board and attendance, quarterly in advance, and for all other expenses whether of damages, removal or death.

11. Visitors are admitted to the Institution between the hours of 10 A. M. and 12 M., and between 2 and 5 P. M., on Mondays, Wednesdays and Fridays only, but no visitor shall be admitted to the wards occupied by patients without express permission from the Superintendent, and especial care is to be taken that no amount of visiting is permitted that might prove injurious to the patients.

12. Sunday shall be observed as a day of rest. The buildings and grounds are not to be exhibited on that day, nor shall any visitor be admitted to the wards, except friends of patients who may be seriously ill.

COMMITMENT OF INSANE PAUPERS AND INDIGENT PERSONS.

General Statutes, 1888, Sec. 487. When any pauper, in any town, shall be insane, a selectman of such town may apply to the Court of Probate of the district wherein said pauper resides, for his admission to the State Hospital for the Insane; and said court shall appoint a respectable physician, who shall fully investigate the facts of the case, and report to said court; and, if such physician shall report that said *pauper* is insane, the court may order such selectman forthwith to take such pauper to the hospital, where he shall be kept and supported so long as may be requisite, and *two dollars and fifty cents* per week of the expense of his support shall be paid by the town legally chargeable with his support, and the balance by the State; and, when an *indigent* person, *not a pauper*, is insane, application may be made by any person in his behalf to the Court of Probate for the district where he resides, who shall appoint a respectable physician and a selectman of the town where said indigent person resides, who shall fully investigate the facts and report to said court, which, if satisfied that such person is indigent and insane, shall order him to be taken, by the person making the application, or such other person as it may direct, to the hospital, *where he shall be kept and supported as long as may be requisite, and half the expense of his support shall be paid by the State, and half by the person making the application.* All proceedings in the Court of Probate upon such application shall be in writing, and lodged and kept in the registry of said court, and whenever a court shall pass an order for the admission of any pauper or indigent person to the hospital, it shall record the same and give a certified copy of such order to the person by whom such pauper or indigent person is to be taken to the hospital, as the warrant for such taking and commitment, and shall also forthwith transmit a like copy to the Governor.

Sec. 3614. The price for keeping any pauper or indigent person shall be fixed by the trustees, and shall not exceed the sum of three dollars and fifty cents per week, and shall be payable quarterly. There shall be taxed monthly by the Comptroller one dollar for each week's board at said hospital, and two dollars for each week's board at any other hospital or asylum for the insane, of all insane paupers belonging to towns in this State committed by Courts of Probate; and one dollar and seventy-five cents for each week's board at said hospital, and one-half of the expense of each week's board at any other hospital or asylum for the insane, of all insane indigent persons so committed.

COMMITMENT OF PRIVATE PATIENTS.

Public Acts, 1889, Chapter 162, Sec. 3. *Except when otherwise specially provided by law*, no person shall be committed or admitted to an asylum without an order signed by a judge of probate, as hereinafter provided.

Sec. 4. Whenever any person in this State shall be insane, or shall be supposed to be insane, any person may make complaint in writing to any judge of probate, within whose district the person complained of shall reside, alleging

that such person is insane and is a fit subject to be confined in an asylum, and when any insane person, who ought to be confined, shall go at large in any town, any person may, and the selectmen thereof shall, make a like complaint to the judge of probate within whose district such town is included. After receiving said complaint, the judge to whom it is made shall forthwith appoint a time, not later than ten days after receipt of said complaint, and a place within said district, for a hearing upon said complaint, and shall cause reasonable notice thereof to be given to said complainant, to the person complained of, and to such relative or relatives of said person, or to any person interested in said person, as said judge shall deem proper, and may adjourn said hearing from time to time for cause. Said judge may issue a warrant for the apprehension and bringing before him of said person complained of, and shall see and examine said person, if in his judgment the condition or conduct of such person renders it necessary and proper so to do, or state in his final order why it was not deemed necessary or advisable so to do.

SEC. 5. In addition to such oral testimony as may be given before such judge at said hearing, there shall be filed with such judge a certificate signed by two physicians, each of whom is a graduate of some legally organized medical institution, and has practiced three years in this State, and neither of whom is connected with any asylum nor related to the person complained of by blood or marriage. Each must have personally examined said person alleged to be insane, within five days of signing said certificate, and each shall certify that, in his opinion, said person is insane and a proper subject for treatment in an asylum; and a copy of said certificate, attested by said judge shall be attached to the final order of said judge, and delivered with said order to the keeper of the asylum to which said insane person shall be committed.

SEC. 6. If, on said hearing, the judge shall find that said person is insane and a fit subject for treatment in an asylum, or that he ought to be confined, he shall make an order in writing, stating that he so finds, and commanding some proper officer, or any fit person, to convey said insane person to the asylum named in said order, unless some person shall undertake, before said judge, and shall give bond to the State conditioned to confine such person in some suitable place of detention, not an asylum, in such manner as said judge shall order. Pending the proceedings for a hearing and examination, said judge may make and enforce such reasonable orders for the care and custody of the person complained of as said judge shall deem suitable and proper.

* * * * * * * * *

SEC. 17. The foregoing provisions of this act shall not extend to, nor affect in any way, the cases of persons convicted of or charged with crime, * * * nor shall they be construed as repealing sections 487, 3683, and 3684 of said General Statutes.

STATE OF CONNECTICUT

EIGHTEENTH ANNUAL REPORT

— OF —

The Connecticut Agricultural Experiment Station

For 1894

Printed by Order of the General Assembly

The publications of this Station are sent free to every citizen of Connecticut who applies for them. Address, The Conn. Agricultural Experiment Station, New Haven, Conn.

NEW HAVEN:
THE TUTTLE, MOREHOUSE & TAYLOR PRESS.
1895

CORRECTIONS.

The Index to the Report of this Station for 1893 is defective under the letter V, p. 331.

Following is the corrected index for that letter:—

Vaccinium Oxycoccus 267
Valuation, Explanations concerning 11
" of Bone in 1893 25
" of Fertilizers, how obtained 14
" meaning of 12
" of Home-mixed Fertilizers 56
" of Mixed Fertilizers 14
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Verbena, Diseases of 284
Vermicularia circinans 273
subeffigurata 263
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The following corrections are to be made in the Report of 1894.

Page 6. At the beginning of the list of manufacturers who have complied with the fertilizer law, insert: G. B. Alderman, Suffield, Special Potato Fertilizer.

Page 45. Eighth line from the bottom, erase the words: "as muriate." The sample **4430** of Shoemaker's Swift-Sure Superphosphate, as shown by the analysis on page 39, contains 3.88 per cent. of potash calculated as sulphate and .59 per cent. calculated as muriate.

OFFICERS AND STAFF FOR 1894.

STATE BOARD OF CONTROL.

Ex-officio.

His Excellency LUZON B. MORRIS, *President.*

	Term expires,
Appointed by Connecticut State Agricultural Society:	
Hon. E. H. HYDE, Stafford, *Vice-President.*	July 1, 1897
Appointed by Board of Trustees of Wesleyan University:	
Prof. W. O. ATWATER, Middletown.	1897
Appointed by Governor and Senate:	
EDWIN HOYT, New Canaan.	1895
JAMES H. WEBB, Hamden.	1896
Appointed by Board of Agriculture:	
T. S. GOLD, West Cornwall.	1895
Appointed by Governing Board of Sheffield Scientific School:	
W. H. BREWER, New Haven, *Secretary and Treasurer.*	1896
Ex-officio.	
S. W. JOHNSON, New Haven, *Director.*	

Executive Committee.

Station Staff.

Chemists.

S. W. JOHNSON, *Director.*
E. H. JENKINS, Ph.D., *Vice-Dir.*
A. L. WINTON, Ph.B.
T. B. OSBORNE, Ph.D.
A. W. OGDEN, Ph.B.
W. R. JOHNSTON, Ph.B.*
G. F. CAMPBELL, Ph.B.†

Mycologist.

WILLIAM C. STURGIS, Ph.D.

Horticulturist.

W. E. BRITTON, B.S.

Grass Gardener.

JAMES B. OLCOTT, South Manchester.

Stenographer and Clerk.

Miss C. S. GREEN.

In charge of Buildings and Grounds.

CHARLES J. RICE.

Laboratory Helpers.

HUGO LANGE. JULIUS KORN.

Sampling Agents.

DENNIS FENN, Milford. M. H. PARKER, So. Coventry.

* Till Aug. 1. † From Oct. 15.

Notice as to Bulletins.

The Bulletins of this Station are mailed free to citizens of Connecticut who apply for them, and to others, as far as the limited editions permit.

Applications should be renewed annually before January 1st.

The matter of all the Bulletins of this Station, in so far as it is new or of permanent value, will be made part of the Annual Report of the Director.

Bulletins earlier than No. 71 and Nos. 83, 93, 100, 101, 102, 106, 109, 111 and 118, are exhausted and cannot be supplied.

Notice as to Supply of Station Reports.

The Station has no supply of its Annual Reports for the years 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1887, 1891, and 1893.

The Annual Report of this Station, printed at State expense, is by law limited to an edition of 12,000 copies, of which 5,000 copies are bound with the Annual Report of the Connecticut State Board of Agriculture, and distributed by the Secretary of the Board, T. S. Gold, West Cornwall, Conn.

After exchanging with other Experiment Stations and Agricultural Journals, the Reports remaining at the disposal of the Station will be sent to Citizens of Connecticut who shall seasonably apply for them, and to others as long as the supply lasts.

Announcement.

The Connecticut Agricultural Experiment Station was established in accordance with an Act of the General Assembly approved March 21, 1877, "for the purpose of promoting Agriculture by scientific investigation and experiment."

The Station is prepared to analyze and test fertilizers, cattle-food, seeds, milk, and other agricultural materials and products, to identify grasses, weeds, moulds, blights, mildews, useful or injurious insects, etc., and to give information on various subjects of Agricultural Science, for the use and advantage of the citizens of Connecticut.

The Station does not undertake sanitary analyses of water.

The Station makes analyses of Fertilizers, Seed-Tests, etc., for the citizens of Connecticut, without charge, provided—

1. That the results are of use to the public and are free to publish.

2. That the samples are taken from stock now in the market, and in accordance with the Station "Instructions for Sampling."

3. That the samples are fully described and retail prices given on the Station "Forms for Description."

The officers of the Station will take pains to obtain for analysis samples of all the commercial fertilizers sold in Connecticut; but the organized coöperation of farmers is essential for the full and timely protection of their interests. Granges, Farmers' Clubs, and like Associations can efficiently work with the Station for this purpose, by sending in duly authenticated samples early during each season of trade.

All other work proper to the Experiment Station that can be used for the public benefit will be done without charge. Work for the private use of individuals is charged for at moderate rates. The Station undertakes no work, the results of which are not at its disposal to use or publish, if deemed advisable for the public good.

Results of analysis or investigation that are of immediate general interest are published in Bulletins, copies of which are sent to each Post Office in this State, and to every citizen of the State who applies for them. The results of all the work of the Station are summed up in the Annual Reports made to the Governor.

It is the wish of the Board of Control to make the Station as widely useful as its resources will admit. Every Connecticut citizen who is concerned in agriculture, whether farmer, manufacturer, or dealer, has the right to apply to the Station for any assistance that comes within its province to render, and the Station will respond to all applications as far as lies in its power.

☞ Instructions and Forms for taking samples, and Terms for testing Fertilizers, Seeds, etc., for private parties, sent on application.

☞ Parcels by Express, to receive attention should be *prepaid.*

☞ Letters sent to individual officers are liable to remain unanswered in case the officer addressed is absent. All communications therefore should be directed simply to the

AGRICULTURAL EXPERIMENT STATION,

NEW HAVEN, CONN.

☞ Station Grounds, Laboratories and Office are on Suburban st., between Whitney avenue and Prospect st., $1\frac{5}{8}$ miles north of City Hall. Suburban st. may be reached by Whitney ave. electric cars, which leave the corner of Chapel and Church sts. four times hourly, viz: on the striking of the clock and at intervals of fifteen minutes thereafter.

☞ The Station has Telephone connection and may be spoken from the Central Telephone Office, 118 Court st., or from Peck & Bishop's Office in Union R. R. Depot.

☞ The Grass Garden, in charge of Mr. James B. Olcott, is near South Manchester and may be reached by A. Gardner's regular Passenger Express starting at 9 A. M. and 1 P. M. from Cheney's Store, So. Manchester, or starting at 10 A. M. and 4 P. M. from Burnside, where connection is made by electric car with Hartford.

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Report of the Treasurer.

Wm. H. Brewer, in account with the Connecticut Agricultural Experiment Station for the fiscal year ending September 30th, 1894.

Receipts.

	Oct. 1893 to June 1894	July to Sept. 1894.	Total.
State Appropriation	$6,000.00	$2,000 00	$8,000.00
United States Appropriation	5,625 00	1,875.00	7,500.00
Analysis Fees due last year rec'd this year	231.89	80.00	311.89
Analysis Fees of this year	4,510.00	157.04	4,667.04
Miscellaneous Receipts	374.55	8.40	382.95
Total Receipts	$16,741.44	$4,120.44	$20,861.88

EXPENDITURES.

	State Acc't	U. S. Acc't.	Total.
Salaries*	$4,839.50	$4,950.00	$9,789.50
" †	1,307.50	1,825.00	3,132.50
Labor†	88.75		88.75
Publications*	170.35	134.22	304.57
" †	5.44		5.44
Postage*	66.78		66.78
" †	60.18		60.18
Stationery*	96.42		96.42
" †	16.32		16.32
Freight and Express†	11.79		11.79
Coal*	13.00		13.00
" †	547.25		547.25
Gas†	230.85		230.85
" †	34.20		34.20
Water*	147.00		147.00
Laboratory Expenses*	1,459.36	29.74	1,489.10
Chemicals†	6.20	32.38	38.58
Laboratory Supplies†	15.77		15.77
Field Experiments*		50.58	50.58
" " †	20.00		20.00
Tobacco Experiments*	175.69		175.69
" " †	267.87		267.87
Dairy Tests*		52.51	52.51
Grass Garden*	200.00	400.00	600.00
" " †	200.00		200.00
Turf Collection†	500.00		500.00
Mycological Expenses*	19.57	7.95	27.52
Miscellaneous Supplies†	61.78		61.78

* For the 9 months, Oct, 1893 to June, 1894, inclusive.
† For the 3 months, July to September, 1894, inclusive.

	State Acc't.	U. S. Acc't.	Total.
Fertilizers†	.....	$17.62	$17.62
Feeding Stuffs†	$23.15	.....	23.15
Library*	287.14	.....	287.14
" †	37.80	.....	37.80
Tools and Machinery†	58.90	.....	58.90
Office Supplies*	59.42	.....	59.42
Furniture†	34.05	.....	34.05
Scientific Apparatus†	35.95	.....	35.95
Traveling Expenses of the Board*	7.51	.....	7.51
" " " " †	22 69	.....	22.69
" " of the Staff†	100.58	.....	100.58
Unclassified Sundries*	299.45	.....	299.45
Contingent Expenses†	3.85	.....	3.85
Telephone*	75.25	.....	75.25
" †	25.25	.....	25.25
Collecting Fertilizers*	320.13	.....	320.13
Insurance*	67.50	.....	67.50
The Establishment Growers, Repairs, etc.*	322.37	.....	322.37
New Greenhouse*	495.52	.....	495.52
" " †	373.54	.....	373.54
Improvement on Buildings†	64.02	.....	64.02
Repairs†	68.11	.....	68.11
	$13,343.75	$7,500.00	$20.843.75
Balance to New Account			18.13
			$20,861.88

The accounts of the treasurer were duly audited December 11th, 1894 by the State Auditors of Public Account.

As in previous years the Analysis Fees of fertilizers known to have been on sale after May 1st and subject to the law concerning commercial fertilizers, coming into the hands of the treasurer after closing the above account, will be credited to the next year's account.

Beginning with July 1st, 1894, all the Agricultural Experiment Stations receiving appropriations from the United States are required to make their treasurer's reports to the Secretary of Agriculture of the United States instead of to the Secretary of the Treasury as heretofore. Said reports must hereafter be made in accordance with schedules prepared by the Department of Agriculture and for the fiscal year used by the general Government.

The treasurer of this station will hereafter be required to make reports for two different fiscal years, that of the United States which ends June 30th, and that of the State which ends Sept. 30th. I have therefore prepared this report for our State fiscal year giving the amounts for nine and three months respectively, that its agreement with that to be made to the Secretary of Agriculture next year may be obvious.

WM. H. BREWER, *Treasurer.*

* For the 9 months, Oct., 1893 to June, 1894, inclusive.

† For the 3 months, July to September, 1894, inclusive.

Report of the Board of Control.

To his Excellency, Luzon B. Morris, Governor of Connecticut:

The Board of Control of the Connecticut Agricultural Experiment Station, herewith submits its report for the year ending October 31st, 1894.

In executing the provisions of the State Fertilizer Law, Messrs. Dennis Fenn and M. H. Parker the agents of this Station have visited seventy-eight towns and villages and have drawn four hundred and fifty-six samples, representing one hundred and fifty-six distinct brands of commercial fertilizers.

In the chemical laboratory of the Station, Messrs. Winton and Ogden, with the aid of Mr. Lange, have made three hundred and thirty-one analyses of commercial fertilizers, manures and manurial waste-products. The results of these analyses have been prepared for publication by Dr. Jenkins, are now in the printer's hands and with other appropriate matter will form Part I of the Eighteenth Annual Report.

In continuation of work begun at this Station in 1885—on the relative availability to growing plants of the various forms of organic nitrogen found in fertilizers and on proposed methods for estimating this availability there have been made this year, one hundred and fifty vegetation experiments, for which Indian corn was grown in pots of artificial soil and supplied with nitrogen from different fertilizers whose relative value as regards their nitrogen, it was thus sought to determine. Eleven articles representing the materials most used in the fertilizer manufacture, were also examined with respect to the solubility of their nitrogen in pepsin solution and under putrefaction. These investigations taken together, furnish a comparison of the three methods of estimating the availability of organic nitrogen.

This investigation is the joint work of the Director and Vice-Director aided by Messrs. Britton, Winton, Ogden and Lange.

A considerable number of feeding stuffs have been analyzed in behalf of purchasers.

On behalf of the State Dairy Commissioner twenty-three samples

of suspected butter and five samples of molasses have been tested by Dr. Jenkins, and in twelve cases expert evidence has been furnished by him in court.

More than two hundred samples of milk and cream have been chemically examined, chiefly to determine butter-fat.

Eighteen nearly complete analyses of milk have been made at the request of milk dealers and the fact of adulteration established in several of the samples.

An extended study has been made of the method of paying for cream, which is at present most commonly used in this State, and of the arrangements which creameries must make in order to adopt the more equitable system of paying patrons according to the butter-fat contained in the cream, as determined by the Babcock test. On request of creamery superintendents, eleven creameries have been visited, in some cases a considerable number of times, to explain and illustrate the working of the new system in all particulars, from the sampling of the cream by the cream-gatherer, to the final monthly calculation of payments and incidentally several hundred tests of milk and cream have been made at the creameries.

As a result of this work, six cream-gathering and two milk-gathering creameries have adopted and are now successfully using the system of payment just referred to.

All this work on feeding stuffs, milk and cream, has been most efficiently performed by Messrs. Winton and Ogden.

The work of Dr. W. C. Sturgis, Mycologist, may be briefly summarized as follows :

A critical study has been made in both the botanical laboratory and the field of the so-called "Early blight" of potatoes.

The value of the treatment of seed potatoes with corrosive sublimate solution just previous to planting, for the prevention of Potato Scab, has been tested in coöperation with Mr. Walter H. Olcott in a field experiment at South Manchester.

Experiments on the treatment of the Pear "Scab" in the orchard of Mr. A. E. Plant, of Branford, begun two years ago, have been continued this year.

The bacterial disease known as "fire blight," which does very considerable damage in this State, has been studied in the botanical laboratory.

Some work has also been done, as opportunity presented, upon other plant diseases, chiefly those of the peach, apple and quince.

During the year Dr. Osborne has carried his investigations on the proteids contained in the seeds of Rye and Barley as far as is practicable at present, and the results of these studies are now ready for publication. He has also made good progress in an investigation of Diastase, that ferment of the cereal grains which transforms starch into sugar, and his preliminary paper on this subject is now ready to be printed. In this work he has been assisted by Mr. Johnston and Mr. Campbell.

The field-work of the Station except as already noted has been in the charge of the Vice-Director, as follows:—

The field experiment on the continuous growth of maize on the same land, begun in 1888, has been carried on this year as before at the farm of Mr. J. H. Webb, of Hamden.

In coöperation with Messrs. S. D. Woodruff & Sons, of Orange, a field experiment has been conducted for testing the effect of nitrate of soda in forcing the tomato crop, but owing to the dry weather has given no results.

The field experiments on the influence of different fertilizers on quality and quantity of the tobacco crop, have been prosecuted on the same plan as last year, in conjunction with the Connecticut Tobacco Experiment Co., at Poquonock.

With the coöperation of Prof. Milton Whitney, formerly of this Station and now Chief of the Division of Agricultural Soils, U. S. Department of Agriculture (which furnished the appropriate meteorological instruments), observations of rainfall, maximum and minimum soil-temperatures and maximum and minimum air-temperatures (by radiation thermometers), were daily made at the Poquonock Tobacco Station. Moisture was also determined in samples of soil taken on five different plots of the tobacco field each day from the time the tobacco plants were set till they were harvested. These samples securely packed, were daily sent by mail to New Haven for this examination which was made by Dr. Jenkins.

In the spring of 1894, a vegetation house, twenty-seven feet long by nineteen wide, was built on the Station grounds, with special reference to experiments on the growth of plants in pots during the summer season. Its construction and uses will be described on subsequent pages.

A forcing house, forty feet long by sixteen feet wide, has just been finished, to be used for experiments with fertilizers applied to winter crops, under glass.

On seventeen days, one or two and sometimes three of the Station Staff have been engaged in attendance at meetings of Granges, Farmers' Institutes, and various other public gatherings of dairymen, orchardists, etc. where they demonstrated the Babcock milk-test, gave addresses and answered questions.

Three Bulletins have been issued during the year, containing in the aggregate seventy octavo pages.

Bulletin No. 118, on the "Literature of Fungous Diseases; a Provisional Bibliography, etc.," by Dr. W. C. Sturgis, issued in March 1894, was made a part of the 17th Annual Report as its preparation had been mostly accomplished during or before the time covered by that Report, and to save the very considerable expense of reprinting.

Bulletin No. 117 on "The Babcock method of determining fat in milk and milk products," published in January, and Bulletin No. 119, on "The Babcock Test as a basis for Payment in Cream-gathering Creameries," issued in May last, have been rewritten to include the results of further work and form part of this Annual Report.

The Station Staff has been increased during the year, by the appointment of a horticulturist. Mr. W. E. Britton, a graduate of the New Hampshire Agricultural and Mechanical College, and a graduate student of horticulture in Cornell University, entered on the duties of this position, on the first of May, 1894.

Mr. W. R. Johnston left the station on the first of August. The place thus made vacant was filled on the fifteenth of October, by Mr. George F. Campbell.

A detailed account of the investigations above referred to, will be found in the Reports of the Station Staff, which are now in preparation.

All of which is respectfully submitted.

WM. H. BREWER, *Secretary.*

New Haven, Conn., November 1st, 1894.

Report of Station Work.

A general statement of the lines of work followed by the Station Staff during the past year and of the results attained is to be found on previous pages, in the Report of the Board of Control.

The following pages present a full and detailed account of the operations of the Station within the twelvemonth ending October 31, 1894.

In the discussion of commercial fertilizers it is found advisable to reprint, annually, certain statements regarding the fertilizer law and the analysis and valuation of fertilizers, to answer questions which are constantly addressed to the Station on these subjects.

THE FERTILIZER LAW OF CONNECTICUT.

The General Assembly at its Session in 1893 passed an act, Chapter CLXXII, amending the fertilizer law previously in force in Connecticut.

The attention of all concerned is called to the following copy of the General Statutes of the State regarding fertilizers which embodies the amendments and is the law now in force.

Copies of the law may be had on application to the Station. Attention is specially called to the following requirements.

1. In case of *all* fertilizers or manures, except stable manure and the products of local manufacturers of less value than ten dollars a ton, the law holds the SELLER responsible for *affixing a correct label or statement* to every package or lot sold or offered, as well as for the *payment of an analysis fee* of ten dollars for each fertilizing ingredient which the fertilizer contains or is claimed to contain, *unless* the MANUFACTURER OR IMPORTER has provided labels or statements and has paid the fee. Sections 4005 and 4007.

The Station understands "the fertilizing ingredients" to be those whose determination in an analysis is necessary for a valuation, and which are generally Nitrogen, Phosphoric acid and Potash. The analysis-fees in case of any fertilizer will therefore usually be ten, twenty or thirty dollars, according as one, two or three of these ingredients are contained or claimed to exist in the fertilizer.

2. The law also requires, *in the case of every commercial fertilizer*, that a *sealed sample* shall be deposited with the Director of the Station by the MANUFACTURER OR IMPORTER, and that a *certified statement* of composition, etc., shall be filed with him, Section 4006.

A statement of the per cent. of Nitrogen, Phosphoric Acid (P_2O_5) and Potash (K_2O), and of their several states or forms, will suffice in most cases. Other ingredients may be named if desired.

In all cases the per cent. of *nitrogen* must be stated. Ammonia may also be given when actually present in ammonia salts, and "ammonia equivalent to nitrogen" may likewise be stated.

The per cent. of soluble and reverted phosphoric acid may be given separately or together, and the term "available" may be used in addition to, but not instead of, soluble and reverted.

The percentage of insoluble phosphoric acid may be stated or omitted.

In case of Bone, Fish, Tankage, Dried Meat, Dried Blood, etc., the chemical composition may take account of the two ingredients: Nitrogen and Phosphoric Acid.

For Potash Salts give always the per cent. of Potash (potassium oxide): that of Sulphate of Potash or Muriate of Potash may also be stated.

The chemical composition of other fertilizers may be given as found in the Station Reports.

3. It is also provided that EVERY PERSON in the State, who sells *any commercial fertilizer of whatever kind or price*, shall annually report certain facts to the Director of the Experiment Station, and on demand of the latter shall deliver a sample for analysis. Section 4008.

4. All "CHEMICALS" that are applied to land, such as Muriate of Potash, Kainite, Sulphate of Potash and Magnesia, Sulphate of Lime (Gypsum or Land Plaster), Sulphate of Ammonia, Nitrate of Potash, Nitrate of Soda, etc.—are considered to come under the law as "Commercial Fertilizers." Dealers in these chemicals must see that packages are suitably labeled. They must also report them to the Station, and see that the analysis fees are duly paid, in order that the Director may be able to discharge his duty as prescribed in Section 4013 of the Act.

It will be noticed that the State exacts no license tax either for making or dealing in fertilizers. For the safety of consumers and the benefit of honest manufacturers and dealers, the State requires that it be known what is offered for sale, and whether fertilizers are what they purport to be. With this object in view the law provides, in Section 4013, that all fertilizers be analyzed and it requires the parties making or selling them to pay for these analyses in part: the State itself paying in part by maintaining the Experiment Station.

ACTS CONCERNING COMMERCIAL FERTILIZERS.

Chapter CCLIII of the General Statutes of Connecticut as amended by Chapter CLXXII of the Acts of the General Assembly, Session of 1893.

SECTION 4005. Every person or company who shall sell, offer, or expose for sale, in this State, any commercial fertilizer or manure except stable manure, and the products of local manufacturers of less value than ten dollars a ton, shall affix conspicuously to every package thereof a plainly printed statement clearly and truly certifying the number of net pounds of fertilizer in the package, the name, brand, or trade-mark under which the fertilizer is sold, the name and address of the manufacturer, the place of manufacture and the chemical composition of the fertilizer, expressed in the terms and manner approved and usually employed by the Connecticut Agricultural Experiment Station.

If any such fertilizer be sold in bulk, such printed statement shall accompany every lot and parcel sold, offered, or exposed for sale.

SEC. 4006. Before any commercial fertilizer is sold, offered, or exposed for sale, the manufacturer, importer, or person who causes it to be sold, or offered for sale, within this State shall file with the director of the Connecticut Agricultural Experiment Station two certified copies of the statement prescribed in section 4005, and shall deposit with said director a sealed glass jar or bottle containing not less than one pound of the fertilizer, accompanied by an affidavit that it is a fair average sample thereof.

SEC. 4007. The manufacturer, importer, agent, or seller of any commercial fertilizer shall pay on or before May 1, annually, to the director of the Connecticut Agricultural Experiment Sta-

tion, an analysis fee of ten dollars for each of the fertilizing ingredients contained or claimed to exist in said fertilizer: *provided*, that when the manufacturer or importer shall have paid the fee herein required for any person acting as agent or seller for such manufacturer or importer, such agent or seller shall not be required to pay the fee prescribed in this section.

SEC. 4008. Every person in this State who sells, or acts as local agent for the sale of any commercial fertilizer of whatever kind or price, shall annually, or at the time of becoming such seller or agent, report to the director of the Connecticut Agricultural Experiment Station his name and brand of said fertilizer, with the name and address of the manufacturer, importer, or party from whom such fertilizer was obtained, and shall, on demand of the director of the Connecticut Agricultural Experiment Station, deliver to said director a sample suitable for analysis of any such fertilizer or manure then and there sold or offered for sale by said seller or agent.

SEC. 4009. No person or party shall sell, offer, or expose for sale, in this state any pulverized leather, raw, steamed, roasted, or in any form, as a fertilizer or as an ingredient of any fertilizer or manure, without explicit printed certificate of the fact, such certificate to be conspicuously affixed to every package of such fertilizer or manure, and to accompany every parcel or lot of the same.

SEC. 4010. Every manufacturer of fish guano, or fertilizers of which the principal ingredient is fish or fish-mass from which the oil has been extracted, shall, before manufacturing or heating the same, and within thirty-six hours from the time such fish or mass has been delivered to him, treat the same with sulphuric acid or other chemical, approved by the director of said experiment station, in such quantity as to arrest decomposition: *provided, however*, that in lieu of such treatment such manufacturers may provide a means for consuming all smoke and vapors arising from such fertilizers during the process of manufacture.

SEC. 4011. Any person violating any provision of the foregoing sections of this chapter shall be fined one hundred dollars for the first offence, and two hundred dollars for each subsequent violation.

SEC. 4012. This chapter shall not affect parties manufacturing, importing, or purchasing fertilizers for their own private use, and not to sell in this State.

SEC. 4013. The director of the Connecticut Agricultural Experiment Station shall pay the analysis-fees received by him into the treasury of the station, and shall cause one or more analyses of each fertilizer to be made and published annually. Said director is hereby authorized, in person or by deputy, to take samples for analysis from any lot or package of manure or fertilizer which may be in the possession of any dealer.

SEC. 4014. The director of the Connecticut Agricultural Experiment Station shall, from time to time, as bulletins of said station may be issued, mail or cause to be mailed two copies, at least, of such bulletins to each post-office in the State.

OBSERVANCE OF THE FERTILIZER LAW.

Here follows an alphabetical list of the MANUFACTURERS who have paid Analysis Fees as required by the Fertilizer Law, and the names or brands of the Fertilizers for which Fees have been paid by them for the year ending May, 1895.

Firm.	*Brand of Fertilizer.*
Armour Packing Co., Kansas City, Mo.	Fine Ground Beef Bone. Fruit, Vegetable and Tobacco Special.
Baker, H. J. & Bro., 93 William St., New York City.	Tobacco Manure. Onion Manure. Potato Manure. Corn Manure. A. A. Ammoniated Superphosphate. Harvest Home Phosphate. Castor Pomace. Pure Ground Raw Bone.
Bowker Fertilizer Co., 43 Chatham St, Boston, Mass.	Stockbridge Special Tobacco Manure. " " Grain Manure. " " Grass Top-Dressing and Forage Crop Manure. Stockbridge Special Potato and Vegetable Manure. Bowker's Hill and Drill Phosphate. " Farm and Garden Phosphate or Ammoniated Bone Fertilizer. " Potato Manure. " Tobacco Grower. " Sure Crop Bone Phosphate.
Bradley Fertilizer Co., 92 State St., Boston, Mass.	Bradley's Superphosphate. " Potato Manure. " Complete Manure for Potatoes and Vegetables. " Complete Manure for Top Dressing Grass and Grain. " Complete Manure for Corn and Grain. " Pure Fine Ground Bone. " Circle Brand Ground Bone and Potash. " Fish and Potash, Anchor Brand. " Fish and Potash, Triangle A Brand. " B. D. Sea Fowl Guano. " Original Coe's Superphosphate. " Farmer's New Method Fertilizer. " High Grade Tobacco Manure. "
Buckingham, C., Southport, Conn.	A No. 1 Fertilizer.
Chicopee Guano Co, 140 Maiden Lane, New York City.	Chicopee Potato Manure. Farmer's Reliable

Firm.	*Brand of Fertilizer.*
Clark's Cove Fertilizer Co., Farlow Building, State St., Boston, Mass.	Great Planet "A." King Philip Guano. Potato and Tobacco Fertilizer. Bay State Fertilizer. Bay State Fertilizer G. G.
Cleveland Linseed Oil Co., Cleveland, Ohio.	Connecticut Wrapper Fertilizer, "Pinney Formula."
Coe Co., The E. Frank, 133–135 Front St., New York City.	High Grade Potato Fertilizer. High Grade Ammoniated Superphosphate. Ground Bone and Potash. Special Tobacco Fertilizer, N. E. Brand. Gold Brand Excelsior. Fish and Potash. Alkaline Bone.
Cooper's Glue Factory, Peter, 17 Burling Slip, New York City.	Bone Dust.
Crocker Fertilizer and Chemical Co., Buffalo, New York.	Crocker's Ammoniated Bone Superphosphate. " Potato, Hop and Tobacco Phosphate. " Special Conn. Tobacco Manure. " Pure Ground Bone. " Ground Bone Meal. " New Rival Ammoniated Bone Superphosphate. " Vegetable Bone Superphosphate. " Ammoniated Wheat and Corn Phosphate. " Ammoniated Practical Superphosphate. " Special Potato Manure.
Cumberland Bone Phosphate Co., Boston, Mass.	Cumberland Superphosphate. " Potato Fertilizer.
Danbury Fertilizer Co., Danbury, Conn.	Bone Meal. Nameless Fertilizer. Potato Manure.
Darling Fertilizer Co., The L. B., Pawtucket, R. I.	Darling's Wheat and Corn Fertilizer. " Animal Fertilizer. " Fine Ground Bone. " Extra Bone Phosphate. " Potato and Root Crop Manure. " Tobacco Grower.
Downes & Griffin, Birmingham, Conn.	Ground Bone.
Ellsworth, F., Hartford, Conn.	Shoemaker's Swift Sure Superphosphate. " " " Bone Meal. Collier Castor Pomace.

Firm.	*Brand of Fertilizer.*
Frisbee Co., L. F., Hartford, Conn.	Bone Meal.
Great Eastern Fertilizer Co., Rutland, Vermont.	Great Eastern General Fertilizer for Grass and Grain. Great Eastern Vegetable, Vine and Tobacco. Great Eastern General for Oats, Buckwheat and Seeding down. Great Eastern General Soluble Bone and Potash Fertilizer.
Kelsey, E. R., Branford, Conn.	Bone, Fish and Potash.
Lister's Agricultural Chemical Works, Newark, N. J.	Celebrated Ground Bone. Ammoniated Dissolved Bone. Potato Fertilizer. Standard Superphosphate. Success Fertilizer.
Mapes Formula and Peruvian Guano Co., 143 Liberty St., New York City.	Complete Manure for Light Soils. " " " General Use. " " "A" Brand. Potato Manure. Tobacco Starter. Fruit and Vine Manure. Grass and Grain Spring Top Dressing. Corn Manure. Fine Dissolved Bone. Tobacco Manure, Wrapper Brand.
Miller, Geo. W., Middlefield, Conn.	Ground Bone. Flour of Bone Phosphate.
National Fertilizer Co., Bridgeport, Conn.	Chittenden's Complete Fertilizer. " Ammoniated Bone Phosphate. " Fish and Potash. " Ground Bone.
Nuhn, Frederick, Waterbury, Conn.	Self-Recommending Fertilizer.
Olds & Whipple, Hartford, Conn.	Red Seal Castor Pomace. O. & W. Special Phosphate.
Peck Bros., Northfield, Conn.	Pure Ground Bone.
Plumb & Winton, Bridgeport, Conn.	Ground Bone.
Preston Fertilizer Co., Greenpoint, L. I.	Onion Fertilizer. Potato Fertilizer. Ammoniated Bone Superphosphate.
Quinnipiack Rendering Co., Meriden, Conn.	Pure Ground Bone.

Firm.	*Brand of Fertilizer.*
Quinnipiac Co., 92 State St., Boston, Mass.	Quinnipiac Phosphate. " Potato Manure. " Market Garden Manure. " Ammoniated Dissolved Bone. " Fish and Potash, Crossed Fishes Brand. " Fish and Potash, Plain Brand. " Pine Island Phosphate. " Havana Tobacco Fertilizer. " Grass Fertilizer. " Corn Manure. " Bone Meal. " Dry Ground Fish. Tankage. Muriate of Potash. Sulphate of Potash. Nitrate of Soda. Sulphate of Ammonia. Dissolved Bone Black.
Read Fertilizer Co., Box 3121, New York City.	Read's Standard. High Grade Farmer's Friend. Fish and Potash. Vegetable and Vine.
Reese, J. S. & Co., Baltimore, Md.	Reese's Potato Special. " New England Favorite.
Rogers & Hubbard Co., Middletown, Conn.	Pure Ground Raw Knuckle Bone Flour. Pure Ground Raw Knuckle Bone Meal. Strictly Pure Fine Bone. Fertilizer for Oats and Top Dressing. Soluble Potato Manure. Soluble Tobacco Manure. Grass and Grain Fertilizer. Fairchild's Formula for Corn and General Crops.
Rogers Mfg. Co., Rockfall, Conn.	Pure Ground Bone. Grass and Grain Fertilizer. Soluble Potato and General Crops. High Grade Fertilizer for Oats and Top Dressing. Complete Fertilizer. High Grade Corn Fertilizer.
Sanderson, L., New Haven, Conn.	Old Reliable Superphosphate. Formula A. (Complete). Pulverized Bone and Meat. Blood, Bone and Meat. Fine Ground Bone. Muriate of Potash. High Grade Sulphate of Potash. Regular Sulphate of Potash. Nitrate of Soda. Sulphate of Ammonia. Dissolved Bone Black.

Firm.	*Brand of Fertilizer.*
Soluble Pacific Guano Co., Boston, Mass.	Pacific Guano. Potato Manure. High Grade General Fertilizer.
Standard Fertilizer Co., Farlow Building, State St., Boston, Mass.	Standard Superphosphate. Standard Complete Manure. Standard Potato and Tobacco Fertilizer.
Walker, Stratman & Co., Pittsburgh, Pa.	Potato Special. Tobacco Special. Banner Fertilizer. Four Fold Fertilizer.
Walton & Whann Co., Wilmington, Delaware.	Diamond Soluble Bone and Potash. Peerless Potato Manure.
Wheeler, M. E. & Co., Rutland, Vermont.	Potato Manure. Corn Fertilizer. Electrical Dissolved Bone. Grass and Oats Fertilizer.
Wilcox, Leander, Mystic, Conn.	Potato, Onion and Tobacco Manure. Ammoniated Bone Phosphate. Complete Bone Superphosphate. High Grade Fish and Potash.
Wilkinson & Co., 54 William St., New York City.	Economical Bone Fertilizer.
Williams & Clark Fertilizer Co., 81 Fulton St., New York City.	Americus Ammoniated Bone Superphosphate. " Potato Phosphate. " High Grade Special. " Pure Bone Meal. " Fine Wrapper Tobacco Grower. " Corn Phosphate. " Potato and Tobacco Fertilizer. " Grass Manure. " Fish and Potash. Royal Bone Phosphate.

COLLECTION AND SAMPLING OF FERTILIZERS.

During the year 310 samples of commercial fertilizers and manurial waste-products have been analyzed. A classified list of them is given on page 18.

On a few of these samples analyses were made for private parties and charged for accordingly. A few samples also were analyzed at request of other Experiment Stations in order to compare and test analytical methods. Results of the examination of all the samples, with these exceptions, are given in detail in the following pages.

During April, May and June, Messrs. Dennis Fenn of Milford, and M. H. Parker of South Coventry agents of this Station, visited seventy-eight towns and villages in Connecticut and drew 456 samples representing 166 distinct brands of commercial fertilizers.

In this way one or more samples were secured of nearly every brand of fertilizer which is offered for sale within the State. When several samples of a single brand were drawn in different parts of the State the analysis was performed, not on any single sample, but on a mixture made of an equal weight of each of the several samples. Thus, it is believed, the average composition of the goods is more fairly represented than by the analysis of any single sample.

The Station agents are instructed in every case to open at least three packages of each brand for sampling, and if the number of packages is large, to take a portion from every tenth one, by means of a sampling tube which withdraws a section or core through the entire length of the bag or barrel.

As a rule, the Station will not analyze samples—

1. From dealer's stock of less than one ton.
2. From stock which has lain over from last season.
3. From stock which evidently is improperly stored, as in bags lying on wet ground or exposed to the weather, etc.

The Station desires the coöperation of farmers, farmers' clubs, and granges in calling attention to new brands of fertilizers, and in securing samples of all goods offered for sale. All samples drawn by other than Station agents *must be drawn in strict accordance with the Station's Instructions for Sampling, and must*

also be properly certified, if the Station analysis is desired. A copy of these Instructions and blank Certificates will be sent on application.

Samples are analyzed as promptly as possible in the order in which they are received. As soon as an analysis is completed a copy of it is sent to the party who furnished the sample, and also to the manufacturer, in order that there may be opportunity for explanation or protest, before the results are published.

The following "Explanations" are intended to embody the principles and data upon which the valuation of fertilizers is based, a knowledge of which is essential to a correct understanding of the analyses that are given on subsequent pages.

EXPLANATIONS CONCERNING THE ANALYSIS OF FERTILIZERS AND THE VALUATION OF THEIR ACTIVE INGREDIENTS.*

The Elements of Fertilizers.

The three chemical elements whose compounds chiefly give value, both commercial and agricultural, to fertilizers are Nitrogen, Phosphorus and Potassium. The other elements found in fertilizers, viz: Sodium, Calcium, Magnesium, Iron, Silicon, Sulphur, Chlorine, Carbon, Hydrogen and Oxygen, which are necessary or advantageous to the growth of vegetation are either so abundant in the soil or may be so cheaply supplied to crops, that they do not considerably affect either the value or cost of high-priced commercial fertilizers.

Nitrogen in fertilizers is, on the whole, the least abundant of their valuable elements and is, therefore, their most costly ingredient.

Free Nitrogen is universally abundant, making up nearly four-fifths of the common air, and appears to be assimilable, with aid of certain bacteria, by leguminous plants (the clovers, alfalfa, peas, beans, lentils, esparsette, lupins, vetches, lathyrus, peanut, yellow locust, honey locust, etc.), and by a few non-leguminous plants, carrying root-nodules, viz: the Oleasters (*Eleagnus*), the Alders (*Alnus*), and a single family of coniferous trees (*Podocarpus*), but not at all, according to present evidence, by the cereals or other field and garden crops.

Organic Nitrogen is the nitrogen of animal and vegetable matters which is chemically united to carbon, hydrogen and oxygen. Some forms of organic nitrogen, as those of blood, flesh and seeds, are highly

* Prepared and revised by the Director.

active as fertilizers; others as found in leather and peat, are comparatively slow in their effect on vegetation, unless these matters are chemically disintegrated. Since organic nitrogen may readily take the form of ammonia it has been termed *potential ammonia.*

Ammonia (NH_3) *and nitric acid* (N_2O_5) are results of the decay of *organic nitrogen* in the soil and manure heap, and contain nitrogen in its most active forms. They occur in commerce—the former in sulphate of ammonia, the latter in nitrate of soda. 17 parts of ammonia or 66 parts of pure sulphate of ammonia contain 14 parts of nitrogen. 85 parts of pure nitrate of soda also contain 14 parts of nitrogen.

PHOSPHORUS is, next to nitrogen, the most costly ingredient of fertilizers, in which it exists in the form of phosphates, usually those of calcium, iron and aluminum, or in case of "superphosphates," to some extent in the form of free phosphoric acid.

Water-Soluble Phosphoric acid is phosphoric acid (or a phosphate) that freely dissolves in water. It is the characteristic ingredient of superphosphates, in which it is produced, by acting on "insoluble" or ("citrate soluble") phosphates, with diluted sulphuric acid. Once well incorporated with the soil, it gradually "reverts" and becomes insoluble, or very slightly soluble in water.

Citrate-soluble Phosphoric acid signifies the phosphoric acid (of various phosphates) that is freely taken up by a hot strong solution of neutral ammonium citrate, which solution is therefore used in analysis to determine its quantity. The designation *citrate-soluble* is synonymous with the less explicit terms *reverted, reduced* and *precipitated,* which all imply phosphoric acid that was once easily soluble in water, but from chemical change has become insoluble in that liquid.

Recent investigation tends to show that water-soluble and citrate-soluble phosphoric acid are on the whole about equally valuable as plant food, and of nearly equal commercial value. In some cases, indeed, the water-soluble gives better results on crops, in others the "reverted" is superior. In most instances there is probably little to choose between them.

Insoluble Phosphoric acid implies various phosphates insoluble both in water and in hot solution of neutral ammonium citrate. The phosphoric acid of Canadian "Apatite," of South Carolina and Florida "Rock Phosphate" and of similar dense mineral phosphates, as well as that of "bone-ash" and "bone-black" is mostly insoluble in this sense, and in the majority of cases, gives no visible good results when these substances, in the usual ground state, are applied to crops. They contain however a small proportion of citrate-soluble phosphoric acid and sometimes, when they are reduced to extremely fine dust (floats) or are applied in large quantities, especially on "sour soils" or in conjunction with abundance of decaying vegetable matter (humus), they operate as efficient fertilizers.

Available Phosphoric acid is an expression properly employed in general, to signify phosphoric acid in any form, or phosphates of any kind that serve to nourish vegetation. In the soil phosphoric acid and all phosphates, whatever their solubilities as defined in the foregoing par-

agraphs, are more or less freely and extensively available to growing plants. Great abundance of "insoluble" phosphoric acid may serve crops equally well with great solubility of a small supply, especially when the soil and the crop carry with them conditions highly favorable to the assimilation of plant food.

In Commercial Fertilizers, "available phosphoric acid" is frequently understood to be the sum total of the "water-soluble" and the "citrate-soluble," with exclusion of the "insoluble."

The "insoluble phosphoric acid" in a commercial fertilizer costing $20 to $50 per ton has very little or no value to the purchaser, because the quantity of it which can commonly go upon an acre of land has no perceptible effect on the crop and because its presence in the fertilizer excludes an equal percentage of more needful and much more valuable ingredients.

In Raw Bone the phosphoric acid (calcium phosphate) is nearly insoluble, because of the animal matter of the bones, which envelops it; but when the animal matter decays in the soil, or when it is disintegrated by boiling or steaming, the phosphate mostly remains in an available form. The phosphoric acid of "Basic-Slag" and of "Grand Cayman's Phosphate" is in some soils as freely taken up by crops as water-soluble phosphoric acid, but in other soils is much less available than the latter.

Phosphoric acid in all the Station analyses is reckoned as "anhydrous phosphoric acid" (P_2O_5) also termed among chemists, phosphoric anhydride, phosphoric oxide, and phosphorus pentoxide.

Potassium is the constituent of Fertilizers, which ranks third in costliness. In plants, soils and fertilizers, it exists in the form of various salts, such as chloride (muriate), sulphate, carbonate, nitrate, silicate, etc. Potassium itself is scarcely known except as a chemical curiosity.

Potash signifies the substance known in chemistry as potassium oxide (K_2O), which is reckoned as the valuable fertilizing ingredient of "potashes" and "potash salts." In these it should be freely soluble in water and is most costly in the form of sulphate, and cheapest in the form of muriate (potassium chloride). In unleached wood-ashes it exists mainly as potassium carbonate.

Valuation of Fertilizers.

The valuation of a fertilizer as practised at this station, consists in calculating the *retail Trade-value* or *cash-cost* (in raw material of good quality) of an amount of nitrogen, phosphoric acid and potash equal to that contained in one ton of the fertilizer.

Plaster, lime, stable manure and nearly all of the less expensive fertilizers have variable prices, which bear no close relation to their chemical composition, but guanos, superphosphates and similar articles, for which $30 to $50 per ton are paid, depend, for their trade-value exclusively on the three substances, *nitrogen*, *phosphoric acid* and *potash*, which are comparatively costly and steady in price. The trade-value

per pound of these ingredients is reckoned from the current market prices of the standard articles which furnish them to commerce.

The consumer, in estimating the reasonable price to pay for high-grade fertilizers, should add to the *Trade-value of the above named ingredients*, a suitable margin for the expenses of manufacture, etc., and for the convenience or other advantage incidental to their use.

Trade-Value of Fertilizer Elements, for 1894.*

The average Trade-values or retail costs in market, per pound, of the ordinarily occurring forms of nitrogen, phosphoric acid and potash in raw materials and chemicals, as found in New England, New York and New Jersey markets during 1894, were as follows:

	Cts. per lb.
Nitrogen in ammonia salts	19
nitrates	14½
Organic nitrogen in dry and fine ground fish, meat and blood	18½
in cotton seed meal and castor pomace	15
in fine bone and tankage	16½
in fine-medium bone and tankage	15
in medium bone and tankage	12
in coarser bone and tankage	7
in hair, horn shavings and coarse fish scrap	7
Phosphoric acid, water-soluble	6
citrate-soluble†	5½
of dry ground fine fish, bone and tankage	5½
of fine-medium bone and tankage	4½
of medium bone and tankage	3
of coarse bone and tankage	2
of fine ground fish, cotton seed meal, castor pomace and wood ashes	5
of mixed fertilizers insoluble in ammonium citrate	2
Potash as high-grade sulphate and in forms free from muriate (or chlorides)	5¼
as muriate	4½

The foregoing are, as nearly as can be estimated, the prices at which, during the six months preceding March last, the respective ingredients were retailed for cash, in our large markets, in those *raw materials* which are the regular source of supply. They also correspond to the

* Adopted at a conference of representatives of the Connecticut, Massachusetts, New Jersey and Rhode Island Stations held in March, 1894.

† Dissolved from 2 grams of the fertilizer, previously extracted with pure water, by 100 c. c. neutral solution of ammonium citrate, sp. gr. 1.09, in 30 minutes, at 65° C., with agitation once in five minutes. Commonly called "reverted" or "backgone" Phosphoric Acid.

average wholesale price for the six months ending March 1st, plus about 20 per cent. in case of goods for which we have wholesale quotations. The valuations obtained by use of the above figures will be found to correspond fairly with the *average retail prices* at the large markets of standard raw materials, such as :

Sulphate of Ammonia,	Muriate of Potash,
Nitrate of Soda,	Sulphate of Potash,
Dried Blood,	Plain Superphosphates,
Azotin,	Dry Ground Fish,
Ammonite,	Bones and Tankage,

Ground South Carolina Rock.

Valuation of Superphosphates, Special Manures and Mixed Fertilizers of High Grade.

The Organic Nitrogen in these classes of goods is reckoned at the price of nitrogen in raw materials of the best quality, 18½ cents.

Insoluble Phosphoric Acid is reckoned at 2 cents per pound. Potash is rated at 4½ cents, if sufficient chlorine is present in the fertilizer to combine with it to make muriate. If there is more Potash present than will combine with the chlorine, then this excess of Potash is reckoned at 5¼ cents per pound.

In most cases the valuation of the ingredients in superphosphates and specials falls below the retail price of these goods. The difference between the two figures represents the manufacturer's charges for converting raw materials into manufactured articles and selling them. The charges are for grinding and mixing, bagging or barreling, storage and transportation, commission to agents and dealers, long credits, interest on investments, bad debts, and finally, profits.

The majority of the manufacturers agree that the average cost of mixing, bagging, handling and cartage ranges from $3.00 to 4.50 per ton.

In 1894 the average selling price of Ammoniated Superphosphates and Guanos was $32.93 per ton, the average valuation was $23.30, and the difference $9.63, an advance of 41.3 per cent. on the valuation and on the wholesale cost of the fertilizing elements in the raw materials.

In case of Special manures the average cost was $38.13, the average valuation $28.62 and the difference $9.51 or 33.2 per cent. advance on the valuation.

To obtain the Valuation of a Fertilizer we multiply the pounds per ton of nitrogen, etc., by the trade-value per pound. We thus get the values per ton of the several ingredients, and adding them together we obtain the total valuation per ton.

In case of *Ground Bone*, the sample is sifted into four grades and we separately compute the nitrogen-value of each grade by multiplying the pounds of nitrogen per ton, by the per cent. of each grade, taking $\frac{1}{100}$th of that product, multiplying it by the trade-value per pound of nitrogen in that grade, and taking this final product as the result in

cents. Summing up the separate values of each grade thus obtained, together with the values of each grade of phosphoric acid, similarly computed, the total is the Valuation of the sample of bone.

Uses and Limitations of Fertilizer Valuation.

The uses of the "Valuation" are two-fold:

1. To show whether a given lot or brand of fertilizers is worth, as a commodity of trade, what it costs. If the selling price is not higher than the valuation, the purchaser may be tolerably sure that the price is reasonable. If the selling price is twenty to twenty-five per cent. higher than the valuation, it may still be a fair price; but in proportion as the cost per ton exceeds the valuation there is reason to doubt the economy of its purchase.

2. Comparisons of the valuation and selling prices of a number of similar fertilizers will generally indicate fairly which is the best for the money.

But the valuation is not to be too literally construed, for in some cases analysis cannot discriminate positively between the active and the inert forms of nitrogen, while the mechanical condition of a fertilizer is an item whose influence cannot always be rightly expressed or appreciated.

For the above first-named purpose of valuation, the trade-values of the fertilizing elements which are employed in the computations should be as exact as possible, and should be frequently corrected to follow the changes of the market.

For the second named use of valuation frequent changes of the trade-value are disadvantageous. because two fertilizers cannot be compared as to their relative money-worth, when their valuations are deduced from different data.

Experience leads to the conclusion that the trade-values adopted at the beginning of the year should be adhered to as nearly as possible throughout the year, notice being taken of considerable changes in the market, in order that due allowance may be made therefor.

Agricultural Value of Fertilizers.

The Agricultural Value of a fertilizer is measured by the benefits received from its use, and depends upon its fertilizing effect, or crop-producing power. As a broad, general rule, it is true that ground bone superphosphates, fish-scraps, dried blood, potash salts, etc., have a high agricultural value which is related to their trade-value, and to a degree determines the latter value. But the rule has many exceptions, and in particular instances the trade-value cannot always be expected to fix or even to indicate the agricultural value. Fertilizing effect depends largely upon soil, crop and weather, and as these vary from place to place, and from year to year, it cannot be foretold or estimated except by the results of past experience, and then only in a general and probable manner.

CLASSIFICATION OF FERTILIZERS ANALYZED.

RAW MATERIALS.

1. *Containing Nitrogen as the Chief Valuable Ingredient.*

Nitrate of Soda	5
Sulphate of Ammonia	2
Dried Blood	1
Ground Horn and Hoof	1
Leather	5
Cotton Seed Meal	16
Castor Pomace	3
Gluten Feed	1

2. *Containing Phosphoric Acid as the Chief Valuable Ingredient.*

Dicalcic Phosphate	1
Basic Slag or Odorless Phosphate	1
Concentrated Phosphate	1
Dissolved Bone Black	3
Dissolved Rock Phosphate	1

3. *Containing Potash as the Chief Valuable Ingredient.*

High Grade Sulphate of Potash	3
Double Sulphate of Potash and Magnesia	3
Muriate of Potash	4

4. *Containing Nitrogen and Phosphoric Acid.*

Bone Manures	26
Tankage	17
Dry Ground Fish	9

MIXED FERTILIZERS.

Bone and Potash	11
Nitrogenous Superphosphates and Guanos	76
Special Manures	102
Home Mixtures	7

MISCELLANEOUS.

Cotton Hull Ashes	17
Unleached Wood Ashes	10
Lime Kiln Ashes	1
Saltpeter Waste	2
Sheep Manure	1
Waste from Enameling of Iron	1
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DESCRIPTION AND ANALYSES OF FERTLIZERS.*

I. Raw Materials Chiefly Valuable for Nitrogen.

Nitrate of Soda or Sodium Nitrate.

Nitrate of Soda is mined in Chili and purified there before shipment. It contains about 16 per cent. of nitrogen, equivalent to 97 per cent. of pure sodium nitrate. The usual guarantee is "96 per cent." of sodium nitrate, equivalent to 15.8 per cent. of nitrogen.

4155. Bought by J. Norris Barnes, Yalesville.

4168. From stock of L. Sanderson, New Haven.

4314. From stock of Olds & Whipple.

4380. Sampled from stock of J. C. Lincoln, Berlin, by J. C. Lincoln. Bought of Bowker Fertilizer Co.

4456. Purchased by Station and dried before analysis.

Analyses.

	4155	4168	4314	4380	4456
Moisture	1.79	1.77	1.50	2.80	.42
Insoluble in water	.27	.16	.16	.18	.18
Sodium Chloride (Salt)	.83	.69	.38	.69	.66
Sodium Sulphate	.48	.43	.16	.30	.39
Sodium Nitrate	96.63	96.95	97.80	96.03	98.35
	100.00	100.00	100.00	100.00	100.00
Equivalent Nitrogen	15.94	16.00	16.14	15.84	16.20
Cost per ton	$ ----	50.00	55.00	49.00	----
Nitrogen costs cents per pound		**15.6**	**17.0**	**15.4**	

Sulphate of Ammonia, or Ammonium Sulphate.

This article, now made on a large scale as a by-product of gas-works, usually contains over 20 per cent. of nitrogen, the equivalent of 94–97 per cent. of ammonium sulphate. The rest is chiefly moisture. The usual guarantee is 25 per cent. of ammonia, which is equivalent to 20.6 per cent. of nitrogen, but commercial sulphate of ammonia commonly contains less than that quantity.

* This chapter, pages 19–65, has been prepared for publication by Dr. Jenkins. The analyses of Fertilizers have been made by Messrs. Winton and Ogden with the constant assistance of Mr. Lange.

4418. Sampled and sent by the Quinnipiac Co., Boston.
4422. Sampled and sent by L. Sanderson, New Haven.

ANALYSES.

	4418	4422
Nitrogen	21.13	20.50
Equivalent Ammonia	25.65	24.88
Retail price per ton	----	$80.00
Nitrogen costs cents per pound	----	**19.5**

DRIED BLOOD.

This consists of slaughter-house blood which has been dried by superheated steam or hot air. It is a finely pulverized, nearly odorless substance, red or dark red in color, and rich in nitrogen that is quickly available to vegetation.

A single sample, **4457** purchased for vegetation experiments contained 13.20 per cent. of nitrogen.

GROUND HORN AND HOOF.

We are informed that this material is made in Chicago from horns and hoofs that are steamed under high pressure, which makes them brittle, so that they can be ground to a fine powder.

A single sample, **4458** obtained for vegetation experiments contained 15.59 per cent. of nitrogen.

COTTON SEED MEAL.

This material is of two kinds which are known in trade respectively as undecorticated and decorticated. In their manufacture cotton seed is first ginned to remove most of the fiber, then passed through a "linter" to take off the short fiber or lint remaining, then through machines which break and separate the hulls. The hulled seed is ground and the oil expressed. The ground cake from the presses is used as a cattle food and fertilizer. The hulls are burned for fuel in the oil factory and the ashes, which contain from 20 to 30 per cent. of potash, are also used as a fertilizer. In case of undecorticated meal the hulls and the ground-press cake are mixed together.

4226. Stock of Smith, Northam & Co., Hartford, sampled and sent by Eugene Brown, Poquonock.

4287. Stock of Smith, Northam & Co., Hartford, sampled and sent by H. H. Austin, Suffield.

4164. Stock of H. K. Brainard, Thompsonville, sampled and sent by C. D. Woodworth, Thompsonville.

4212. Stock of Olds & Whipple, Hartford, sampled and sent by Eugene Brown, Poquonock.

4143 and **4144.** Samples of two lots of meal made by the Charlotte Oil and Fertilizer Co., Charlotte, N. C., sampled from stock of J. F. Hyde, Hampton, by C. A. Hammond, Elliot.

4321. Stock of L. Sanderson, New Haven, sampled and sent by F. C. Root, Suffield, from a car lot bought by J. H. Van Gelder, Suffield.

4297. Stock of Olds & Whipple, Hartford, sampled and sent by E. J. Wells, E. Windsor Hill.

4289. Stock of R. A. Parker, Warehouse Point, sampled and sent by J. B. Noble, E. Windsor Hill.

4227. Stock of Olds & Whipple, Hartford, sampled by E. J. Wells, E. Windsor Hill.

4288. Stock of W. W. Cooper, Suffield, sampled and sent by H. H. Austin, Suffield.

4199. Stock of Coles & Weeks, Middletown, sampled and sent by J. M. Hubbard, Middletown.

4301. Bought of H. J. Baker & Bro., sampled and sent by E. A. Wildman, New Milford.

This is undecorticated, whence the low content of nitrogen.

4340. Stock of Olds & Whipple, sampled and sent by E. S. Clark, Hartford.

4358. Stock bought of Edward Austin, by H. N. Loomis, Suffield, sampled and sent by F. C. Root.

4359. Stock bought of Edward Austin by H. A. Sheldon, Suffield, sampled and sent by F. C. Root.

The prices quoted in the table represent average *retail* rates. In many cases car lots were bought at from $24.25 to $24.75 per ton at the purchaser's freight station.

The undecorticated **4301,** even at wholesale rates, is not as economical to buy as the hulled meal at retail prices.

Attention is again called to the merits of Cotton Seed Meal as a fertilizer. It is the cheapest supply of available organic nitrogen now in market. Experience demonstrates that it is very prompt to act and quite odorless.

Its use as a fertilizer seems to be mostly confined at present to tobacco, but it is equally valuable for other crops and at present rates, deserves to be used extensively, to replace the higher priced nitrogen of dried blood, tankage and ground bone.

Analyses of Cotton Seed Meal.

	4226	4287	4164	4212	4143	4144	4321	4297	4289	4227	4288	4199	4301	4340	4358	4359
Nitrogen	7.78	7.62	7.30	7.35	7.27	7.13	7.39	7.39	7.31	7.31	7.27	7.18	4.21	6.98	7.23	7.43
Phosphoric Acid	3.13	2.94	3.13	2.62	2.60	2.87	2.27	2.25	2.26	2.25	2.30	2.48	2.17	----	----	----
Potash	1.84	1.68	1.92	1.94	1.91	1.98	1.70	1.78	1.65	1.69	1.68	1.86	1.62	----	----	----
Cost per ton	$26.50	26.50	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.50	27.00	17.50*	----	----	----
Nitrogen costs cents per pound†	13.8	14.3	14.3	14.5	14.6	14.7	14 9	14.9	15.1	15.1	15.4	15.7	16.2	----	----	----

* Wholesale, car lots.

† Allowing 5 cents per pound for phosphoric acid and 5¼ cents per pound for potash.

Castor Pomace.

This is the ground residue of castor beans from which castor oil has been extracted. An excellent fertilizer, but is extremely poisonous to animals which often eat it greedily when the opportunity offers.

4306. Red Seal Castor Pomace, made by the Red Seal Castor Oil Co., St. Louis, Mo., sampled from stock of Olds & Whipple, Hartford.

4204. Collier Castor Pomace, sampled from stock of F. Ellsworth, Hartford.

4213. Baker & Bro's. Castor Pomace, made by H. J. Baker & Bro., N. Y., sampled by W. H. Olcott, So. Manchester, from stock of W. L. Buckland, Burnside.

Analyses.

	4306	4204	4213
Nitrogen	5.59	5.40	5.34
Phosphoric Acid	1.69	1.51	1.39
Potash	1.89	.98	.93
Cost per ton	$24.00	24.00	24.00
Nitrogen costs per pound*	**19.1**	**19.9**	**20.2**

Castor Pomace is regarded by some growers as the very best source of nitrogen for the tobacco crop. They are therefore quite willing to pay a special price for nitrogen in this form. On any other crop there can be no economy in using castor pomace when cotton-seed nitrogen can be bought for four or five cents less per pound.

1570 pounds of cotton seed meal contain as much nitrogen as 2000 pounds of castor pomace and now cost $3.20 less.

In the tests made in 1892 by this Station coöperating with the Conn. Tobacco Experiment Company, wrapper-tobacco grown with aid of castor pomace did not differ either in quality or yield from that manured with cotton seed meal, using equal amounts of nitrogen.

Gluten Feed.

This is a residue from the glucose manufacture much used as feed.

* Allowing 5 cents per pound for phosphoric acid and 5½ cents per pound for potash.

A sample, **4455,** was sent by H. J. Lathrop of Suffield, with inquiry as to its value as a fertilizer for tobacco.

The sample contained 3.06 per cent. of nitrogen, but no considerable quantities of potash and phosphoric acid.

At the price given, $16 to $17 per ton, the pound of nitrogen costs 26 cents, while in cotton seed meal it costs little more than half as much.

II. Raw Materials of High Grade Containing Phosphoric Acid as the Chief Valuable Ingredient.

Odorless Phosphate.*

4200. Bought of Allison, Stroup & Co., N. Y. city., general agents. Sampled and sent by J. M. Hubbard, Middletown. Cost $19 per ton in car lots.

This material, a by-product of the steel manufacture, contains 21.58 per cent. of phosphoric acid of which 6.42 per cent. is soluble in ammonium citrate.

"Odorless phosphate" contains, besides 20 per cent. or more of phosphoric acid, some 45 to 50 per cent. of lime, 10 of oxide of iron, 5 to 7 of silica and smaller quantities of manganese, alumina and magnesia.

That the phosphoric acid of "odorless phosphate" is so readily available as to make its use profitable under some conditions has been abundantly proved by experience in this country and abroad.

Wagner, from the results of carefully conducted vegetation experiments concluded, that two parts of phosphoric acid in the form of *very finely ground* basic slag have the same crop-producing power *in the first year* as one part of water-soluble phosphoric acid of a superphosphate. When the slag is not extremely fine its fertilizing value is very much less than this.

That is 100 pounds of dissolved bone black and 148 pounds of basic slag, will, on land which is deficient in phosphates, produce about the same crop-increase in the season following the application.

But this statement can only be roughly true in a general sense.

The comparative effect of basic slag and plain superphosphates depends largely on the quality of the soil and the kind of crop.

* Also known as Basic Slag, Thomas Slag or Thomas-Gilchrist Slag.

In general basic slag will have its best effect on moist soils rich in humus and on crops, like corn, which have a long period of growth. It is recommended for orchards and for grass land before seeding down.

In the reports of this Station for 1887, 1888 and 1889 are recorded the results of field trials with imported basic slag (costing but $12.50 per ton) which illustrate its value as a fertilizer.

At the price now quoted, phosphoric acid in this article costs about 4.4 cents per pound *in car lots.*

This is somewhat more than half the price of water-soluble phosphoric acid in dissolved bone black.

Attention is also called to the analysis given below, No. 4152, of dissolved So. Carolina rock, the price of which was exceptionally low, but whose water-soluble phosphoric acid costs little more than half as much as the phosphoric acid of the basic slag of which two-thirds is insoluble both in water and ammonium citrate.

Dissolved Bone Black and Dissolved Rock Phosphate.

Dissolved Bone Black.

Bone Black, made by subjecting bone to a red heat without access of air, is used in sugar refineries to decolorize sugar solutions. The waste bone black dried, and treated with oil of vitriol makes a "superphosphate" of high grade which does not cake together on standing, but remains as a fine powder suitable for application to the land.

4171. Stock of L. Sanderson, New Haven.

4315. Stock of D. Moriarty, Yalesville, agent of Quinnipiac Co., of Boston.

Dissolved Rock Phosphate or Acid Rock.

4152. This material, made by treating the mineral phosphates mined in So. Carolina and Florida with oil of vitriol, is the most common source of the phosphoric acid of factory-mixed fertilizers.

The per cent. of phosphoric acid in a fertilizer multiplied by 2.18 gives the amount of tricalcium phosphate or so-called "bone phosphate," which figures in commercial transactions and signifies not that the phosphate is in the form of bone, but is reckoned on the same basis in accordance with trade usage.

4152. Bought in Carteret, N. J., by J. Norris Barnes, Yalesville. The price is exceptionally low even for car lots.

ANALYSES.

	4171	4315	4152
Water-soluble phosphoric acid	17.17	14.51	10.78
Citrate-soluble or reverted phosphoric acid	.23	.37	3.51
Insoluble phosphoric acid	.08	.00	1.42
Total phosphoric acid	17.48	14.88	15.71
Cost per ton	$26.00	24.00	12.00*
Water-soluble phosphoric acid costs cents per pound	**7.4**	**8.2**	**3.5**

This material, which should contain 12–14 per cent. of soluble and reverted phosphoric acid, is apt to cake on keeping, but if mixed promptly with sufficient cotton-seed meal, tankage, or other organic matter, there is no difficulty in handling it.

III. RAW MATERIALS OF HIGH GRADE CONTAINING POTASH.

HIGH GRADE SULPHATE OF POTASH.

This chemical should contain over 90 per cent. of pure potassium sulphate (sulphate of potash) or about fifty per cent. of potassium oxide the same quantity as is supplied by muriate, and should be nearly free from chlorine.

Two samples, **4337** and **4381,** sent to the Station as "High grade Sulphate of Potash," proved to be cotton hull ashes! The analyses of these goods will be found with the others of cotton hull ashes.

4169. From L. Sanderson, New Haven.

4286. Sampled by H. H. Austin, Suffield, from stock purchased by him.

[For analyses see table on page 27.]

DOUBLE SULPHATE OF POTASH AND MAGNESIA.

This material is usually sold as "sulphate of potash" or "manure salt," on a guarantee of "48–50 per cent. sulphate," which is equivalent to 25.9–27.0 per cent. of potassium oxide. Besides some 46–50 per cent. of potassium sulphate it contains over 30 per cent. of magnesium sulphate, chlorine equivalent to 3 per cent. of common salt, a little sodium and calcium sulphates, with varying quantities of moisture.

* In car lots.

4170. From L. Sanderson, New Haven.

4295. Sampled and sent by E. J. Wells, East Windsor Hill, from stock of Olds & Whipple, Hartford, agents of Quinnipiac Co., Boston.

4420. Sampled and sent by the Quinnipiac Co., Boston.

[For analyses see the following table.]

Muriate of Potash.

Commercial muriate of potash contains about 80 per cent. of muriate of potash (potassium chloride) 15 per cent. or more of common salt (sodium chloride), and 4 per cent. or more of water.

It is generally retailed on a guarantee of 80 per cent. muriate, which is equivalent to 50.5 per cent. of potassium oxide.

4151. Sampled by J. Norris Barnes, Yalesville, from a supply bought in New York.

4175. Stock of L. Sanderson, New Haven.

4292. Sampled by E. C. Warner, Fair Haven, from goods purchased of L. Sanderson, New Haven.

4419. Sampled and sent by the Quinnipiac Co., Boston.

Analyses.

	4169	4286	4170	4295	4420	4151	4175	4292	4419
Potassium oxide soluble in water	48.96	49.68	26.47	27.34	32.35	56.65	49.07	52.02	44.96
Equivalent sulphate of potash	90.58	91.91	48.96	50.57	59.84	----	----	----	----
Equivalent muriate of potash	----	----	----	----	----	89.50	77.52	82.19	71.03
Cost per ton	$55.00	51.00	30.00	30.00	----	37.80*	42.50	42.50	----
Potassium oxide costs cents per pound	5.6	5.1	5.7	5.5	----		4.3	4.1	----

The average cost of potassium oxide (potash) in the form of high grade sulphate is not far from 5½ cents, its cost in the double sulphate of potash and magnesia is about the same. Potash in the form of muriate is about one and one-quarter cents per pound cheaper.

For all crops except tobacco, sugar beets and possibly potatoes, muriate of potash is altogether the most economical source of supply.

* f. o. b., New York.

If muriate is applied in moderate quantity in the fall or very early spring to potato land no damage to the quality or productiveness of the crop need be feared.

IV. Raw Materials containing Nitrogen and Phosphoric Acid.

Bone Manures.

The terms "Bone Dust," "Ground Bone," "Bone Meal" and "Bone" applied to fertilizers, sometimes signify material made from dry, clean and pure bones; in other cases these terms refer to the result of crushing fresh or moist bones which have been thrown out either raw or after cooking, with more or less meat, tendon, and grease and—if taken from garbage or ash heaps—with ashes or soil adhering; again they denote mixtures of bone, blood, meat and other slaughter-house refuse which have been cooked in steam-tanks to recover grease, and are then dried and sometimes sold as "tankage;" or, finally, they apply to bone from which a large share of the nitrogenous substance has been extracted in the glue manufacture. The nitrogen of all these varieties of bone when they are in the same state of mechanical subdivision has essentially the same fertilizing value.

The method adopted for the valuation of bone manures, which takes account of their mechanical condition as well as chemical composition is fully explained on page 16.

1. *Sampled by Station agents.*

On following pages are tabulated eighteen analyses of this class. The last sample **4184** is a mixture of bone and salts of which the latter were perhaps added to dry and preserve the former.

Excluding 4184 from the calculation, the average cost of the seventeen samples of bone manure was $33.59 and the average valuation $32.01.

The valuation during this year has therefore been rather lower than is justified by the market prices.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealer's Cash Price per Ton.	Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Chemical Analysis.		Mechanical Analysis.			
							Nitrogen.	Phos. Acid.	Finer than			Coarser than 1 inch.
									$\frac{1}{50}$ inch.	$\frac{1}{25}$ inch.	$\frac{1}{12}$ inch.	
						Valuation exceeds cost.						
4185	Pure Ground Raw Bone.	H. J. Baker & Bro., 93 William St., N. Y. City.	C. O. Jelliff & Co., Southport.	$30.00	$34.13	12.1	3.54	23.28	65	22	13	--
4271	Bone Meal.	Danbury Fertilizer Co., Danbury.	S. D. Woodruff & Sons, Orange.	29.00	32.96	12.0	3.89	22.94	40	42	18	--
4210	Fine Ground Beef Bone.	Armour Packing Co., Kansas City, Kansas.	F. C. Vibert, Hockanum.	33.00	34.87	5.3	3.66	24.20	59	26	15	--
4207	The Rogers & Hubbard Co's Strictly Pure Fine Bone.	The Rogers & Hubbard Co., Middletown.	Marshall Porter, Hebron.	30.00	31.26	4 0	3.95	22.16	47	24	22	7
4319	Ground Bone Meal.	Crocker Fertilizer and Chemical Co., Buffalo, N. Y.	J. C. Lincoln, Berlin.	32.00	33.30	3.9	2.47	27.12	55	27	15	3
4173	Ground Bone.	L. Sanderson, New Haven.	Manufacturer.	33.00	34.22	3.5	2.62	27.08	61	23	13	3
4208	Swift Sure Bone Meal.	M. L. Shoemaker & Co., Philadelphia, Pa.	F. Ellsworth, Hartford.	40.00	41.28	3.1	6.10	22.06	62	31	7	-
						Cost exceeds Valuation.						
4273	The Rogers & Hubbard Co's Pure Raw Knuckle Bone Meal.	The Rogers & Hubbard Co., Middletown.	Manufacturer. J.P.Barstow & Co., Norwich.	38.00 42.00	37.25	2.0	3.98	25.88	52	35	13	--
4313	The Rogers & Hubbard Co's Pure Raw Knuckle Bone Flour.	The Rogers & Hubbard Co., Middletown.	Manufacturer.	40.00	38.94	2.7	4.07	25.94	56	42	2	--
4211	Fine Ground Bone.	Bradley Fertilizer Co., 92 State St., Boston, Mass.	H. H. Davenport, Pomfret. A. C. Sternberg, Hartford. J. F. Elwood, Greens Farms.	31.00 32.00 29.00	29.94	3.5	3.13	21.03	58	25	17	--
4183	Fine Ground Bone.	L. B. Darling Fertilizer Co., Pawtucket, R. I.	S. W. Bray, Milford.	35.00	33.25	5.2	2.26	26.11	66	24	10	--
4317	Ground Bone.	Downs & Griffin, Birmingham	Manufacturer.	30.00	26.62	12.6	4.43	21.79	26	17	28	29
4312	Pure Bone Meal.	Quinnipiac Co., 92 State St., Boston, Mass.	J. W. Gardner, Cromwell.	34.00	29.25	16.2	3.03	20.76	57	25	18	--
4378	Americus Brand Bone Meal.	Williams & Clark Fertilizer Co., 81 Fulton St., N. Y. City.	D. B. Wilson, Waterbury.	36.00	30.56	17.8	2.82	22.45	60	25	14	1
4318	Pure Ground Bone.	Crocker Fertilizer Co., Buffalo, N. Y.	J. F. Holmes, Ridgefield.	40.00	33.03	21.1	4.18	25.20	36	28	27	9
4267	Pure Ground Bone.	Peck Bros., Northfield.	D. B. Wilson, Waterbury.	30.00	22.82	31.4	4.25	21.52	7	19	38	36
4311	Ground Bone.	Quinnipiac Rendering Co., Meriden.	Manufacturer.	30.00	20.47	46.5	4.21	23 36	9	9	15	67
4184	Celebrated Ground Bone.	Lister's Agricultural Chemical Works, Newark, N. J.	A. N. Clark, Milford.	30.00	20.29	47.8	1.87	17.76	47	19	14	20

2. *Sampled by manufacturers; and* 3. *Sampled by consumers.*

Sample **4228** deposited at the Station by the manufacturer in compliance with the law, was analyzed to meet the requirement of the law which calls for an annual analysis of each brand. The sampling agents of the station did not succeed in finding this brand on sale in the State.

The other samples described below were sent in by private parties and this Station is not responsible for the accuracy of the sampling. The Station holds however in each case a written certificate that the sample was drawn in accordance with its printed instructions.

2. *Sampled by manufacturers.*

4228. Bone Meal made by the L. T. Frisbee Co., Hartford.

3. *Sampled by consumers.*

4153. Bone bought in New York by J. Norris Barnes, Yalesville. Sample drawn by him.

4158. Chittenden's Ground Bone. Sold by National Fertilizer Co. Bridgeport. Sampled and sent by T. J. Stroud, Shaker Station.

4296. Bone bought of Olds & Whipple, Hartford. Sampled and sent by E. J. Wells, E. Windsor Hill.

4448 and **4449.** Bone bought of H. K. Brainard, Thompsonville, said to be from H. J. Baker & Bro. N. Y.

4448. Sampled and sent by T. J. Stroud, Shaker Station.

4449. Sampled and sent by Sumner F. Sikes, Suffield.

MECHANICAL ANALYSES.

	4228	4153	4158	4296	4448	4449
Fine, smaller than $\frac{1}{50}$ inch	96	0	67	60	57	57
Fine medium, smaller than $\frac{1}{25}$ inch,	4	37	20	23	42	42
Medium, smaller than $\frac{1}{12}$ inch	0	60	11	16	1	1
Coarse, larger than $\frac{1}{12}$ inch	0	3	2	1	0	0
	100	100	100	100	100	100

CHEMICAL ANALYSES.

Nitrogen	2.53	4.10	2.78	2.82	3.72	3.80
Phosphoric acid	26.80	24.78	26.00	22.43	21.11	21.30
Cost per ton	$----	22.50*	----	33.00	----	32.00
Valuation per ton	$37.59	28.11	34.36	30.36	33.15	33.60

* Car lot.

Sample No. **4209** was reported by the sampling agent to have been drawn from stock of G. S. Butler, Cromwell, labelled The Rogers & Hubbard Co's. Strictly Pure Fine Bone.

The Rogers & Hubbard Co. object that the analysis does not represent the composition of the brand named, see No. **4207** in the table page 29, and that there is probably some mistake about the sample.

The analysis of Sample No. **4375,** Pure Fine Ground Bone made by the Rogers Manufacturing Co. Rockfall, sent by the manufacturers, is objected to by them because the sample is coarser than the average of their ground bone. For these reasons the two analyses are not included in the foregoing Table.

MECHANICAL ANALYSES.

	4209	4375
Fine, smaller than $\frac{1}{50}$ inch	49	21
Fine medium, smaller than $\frac{1}{25}$ inch	40	30
Medium, smaller than $\frac{1}{12}$ inch	11	40
Coarse, larger than $\frac{1}{12}$ inch	0	9
	100	100

CHEMICAL ANALYSES.

Nitrogen	3.60	4.23
Phosphoric acid	25.80	21.74
Cost per ton	$30.00	----
Valuation per ton	$36.02	$28.20

TANKAGE.

This name is applied to the sediment remaining in tanks where meat scrap and bone are cooked with water to separate the fat. After boiling or steaming, the fat rises to the surface and is removed, the soup is run off, and the settlings at the bottom are dried and sold as tankage.

Sampled by Station Agent.

4123. Made by C. H. Davis & Co. Norwich.

4172. Pulverized Bone and Meat. Stock of L. Sanderson, New Haven.

4174. Blood, Bone and Meat. Stock of L. Sanderson, New Haven.

4252. Bone Fertilizer. Made by Plumb & Winton, Bridgeport.

4316. Bone Tankage. Made by Geo. F. Taylor & Brush, New York City.

MECHANICAL ANALYSES.

	4123	4172	4174	4252	4316
Fine, smaller than $\frac{1}{50}$ inch	30	71	63	64	53
Fine medium, smaller than $\frac{1}{25}$ inch	32	19	20	22	19
Medium, smaller than $\frac{1}{12}$ inch	20	9	11	13	18
Coarse, larger than $\frac{1}{12}$ inch	18	1	6	1	10
	100	100	100	100	100

CHEMICAL ANALYSES.

Nitrogen	4.92	3.79	5.29	5.40	6.27
Phosphoric acid	15.03	24.03	17.49	18.04	17.47
Valuation per ton	$25.47	36.24	32.88	34.48	33.88
Cost per ton	$20.00	35.00	35.00	30.00	21.90*

Sampled by manufacturer or consumers.

4421. Tankage sold and sampled by the Quinnipiac Co., Boston.

4426. Bone Tankage. Sold and sampled by C. Buckingham, Southport.

4070. Acidified Tankage bought and sampled by Geo. Butler, Cromwell.

4154. Tankage made by the Meriden Provision Co., Meriden. Sampled by J. Norris Barnes, Yalesville.

4298. Bone and Meat. Stock of A. Pouleur, Windsor. Sampled and sent by E. J. Wells, E. Windsor Hill.

MECHANICAL ANALYSES.

	4421	4426	4070	4154	4298
Fine, smaller than $\frac{1}{50}$ inch	69	24	40	58	55
Fine medium, smaller than $\frac{1}{25}$ inch	20	27	32	15	18
Medium, smaller than $\frac{1}{12}$ inch	11	37	20	11	14
Coarse, larger than $\frac{1}{12}$ inch	0	12	8	16	13
	100	100	100	100	100

CHEMICAL ANALYSES AND VALUATIONS.

Nitrogen	5.67	4.57	4.55	5.89	2.88
Phosphoric acid	11.95	16.12	4.39†	13.24	25.10
Valuation per ton	$29.84	24.69	14.45	28.77	30.97

*Car lots.

† Of which 3.98 per cent. is soluble in water.

Dry Ground Fish.

This material is often sprinkled with diluted oil of vitriol to hinder decay during drying, and the bones of the fish are as a result softened and to some extent dissolved.

4203. Pure Dry Fish Guano. Made by The Miles Fertilizer and Oil Co., Milford. Sampled by Station agent from stock of Olds & Whipple, Hartford.

4379. Dry Ground Fish. Sold by Quinnipiac Co. Boston. Sampled by Station agent from stock of D. C. Wood, Stratford.

4293. Dry Ground Fish. Made by Leander Wilcox, Mystic. Sampled and sent by H. H. Austin, Suffield.

Analyses.

	4203	4379	4293
Nitrogen as ammonia	.35	----	.27
Nitrogen, organic	8.55	7.97	8.96
Total nitrogen	**8.90**	**7.97**	**9.23**
Water-soluble phosphoric acid	.48	.52	.86
Citrate-soluble (reverted) phosphoric acid	5.50	5.08	4.26
Insoluble phosphoric acid	1.34	.90	2.36
Total phosphoric acid	**7.32**	**6.50**	**7.48**
Cost per ton	$38.00	38.00	35.00*
Valuation per ton	$40.14	36.06	40.84

Mixed Fertilizers.

Bone and Potash.

4377. Circle Brand Bone and Potash, made by Bradley Fertilizer Co., Boston, and sample furnished by them.

The samples named below were drawn by an agent of this Station.

4266. A1 Fertilizer, made by C. Buckingham, Southport. Stock of R. C. Wilcox, Guilford.

As the results of this analysis were unsatisfactory, Mr. Buckingham asked that another sample be drawn, which is **4427,** A1 Fertilizer, made by C. Buckingham, and drawn from stock at his warehouse.

4268. Self Recommending Fertilizer, made by F. Nuhn, Waterbury, sampled from stock of manufacturer.

4305. Square Brand Bone and Potash, made by Bowker Fertilizer Co., Boston, Mass., sampled from stock of D. B. Wilson, Waterbury.

*In car lots.

4428. Ground Bone and Potash, made by The E. F. Coe Co., N. Y. Stock of Wheeler & Howes, Bridgeport.

MECHANICAL ANALYSES.

	4377	4266	4427	4268	4305	4428
Fine, smaller than $\frac{1}{50}$ inch	54	60	52	48	63	57
Fine medium, smaller than $\frac{1}{25}$ inch	33	23	24	22	21	26
Medium, smaller than $\frac{1}{12}$ inch	13	13	18	17	13	15
Coarse, larger than $\frac{1}{12}$ inch	0	4	6	13	3	2
	100	100	100	100	100	100

CHEMICAL ANALYSES.

Nitrogen	2.32	4.45	4.57	3.75	1.76	2.10
Phosphoric acid	19.34	10.45	11.00	19.83	18.68	23.19
Potash	3.61	5.75*	5.94†	4.27	1.91	2.03‡
Cost per ton		$36.00	36.00	35.00	29.00	30.00
Valuation per ton	$28.16	29.50	29.71	31.92	25.27	30.75

4182. Was drawn from stock of Elmer S. Banks, Southport. It purported to be E. F. Coe's Bone and Potash.

It contained 1.35 per cent. of nitrogen, 18.04 per cent. of phosphoric acid and 2.48 per cent. of potash.

The manufacturer objected that this analysis did not at all represent the goods and requested that another sample be drawn and tested. The analysis of the second sample is given in the table above, No. **4428.**

The two following samples are called "bone and potash," but they are not stated to contain any nitrogen.

4382. Diamond Brand Bone and Potash, made by Walton, Whann & Co., Wilmington, Del. Stock of W. S. Hill, Southford.

4383. Bone and Potash, made by Great Eastern Fertilizer Co., Rutland, Vt. Stock of J. U. Sanders, North Stamford.

ANALYSES.

	4382	4383
Water-soluble phosphoric acid	11.42	6.56
Citrate-soluble (reverted) phosphoric acid	2.34	4.42
Insoluble phosphoric acid	.67	.33
Potash, as muriate	2.94	2.21
Valuation per ton	$19.19	14.85
Cost per ton	$25.00	30.00

* 5.03 per cent in form of sulphate.
† 5.01 per cent in form of sulphate.
‡ 1.73 per cent in form of sulphate.

The two following samples were drawn by C. J. Dewey, Buckland. They are said to represent two different lots of Bradley Fertilizer Co.'s Bone and Potash, Circle Brand, shipped direct to Mr. Dewey by the manufacturer.

Mechanical Analyses.

	4458	4459
Fine, smaller than $\frac{1}{50}$ inch	45	55
Fine medium, smaller than $\frac{1}{25}$ inch	18	27
Medium, smaller than $\frac{1}{12}$ inch	25	14
Coarse, larger than $\frac{1}{12}$ inch	12	4
	100	100

Chemical Analyses.

Nitrogen	2.52	2.12
Phosphoric acid	11.77	12.67
Potash	2.46	2.48
Cost per ton	$33.00	33.00
Valuation per ton	$19.33	20.67

II. Nitrogenous Superphosphates and Guanos.

Here are included those mixed fertilizers containing nitrogen, phosphoric acid and in most cases potash, which are not designed by their manufacturers for use on any special crop. "Special Manures" are noticed further on.

1. *Samples drawn by Station agents.*

In the tables on pages 38 to 43 are tabulated the analyses of fifty-three brands, made on samples collected by the Station agents.

The Guarantees.

The law of Connecticut requires every package of fertilizer to bear a statement of the actual composition of the goods. This statement expresses the quantities of nitrogen, phosphoric acid and potash within certain limits, for instance "nitrogen 2–4 per cent."

If a fertilizer with such a guarantee actually contains 2 per cent. of nitrogen, it justifies the manufacturer's statement.

It is the lowest figures of the guarantee therefore that purchasers should regard.

Of the fifty-three brands here reported sixteen are below their minimum guarantee in respect of one ingredient, and two in respect of two ingredients. That is, more than one-fourth of all the nitrogenous superphosphates in our market contain less of one or of two ingredients than they are claimed to contain.

It is urged that an excess of one ingredient over the guarantee should be held to make good the deficiency of another. But with reasonable care and skill in the manufacture and in the sampling and analysis of the goods the actual analysis should not fall below the minimum guaranteed in any respect particularly when wide limits are allowed in the guarantees themselves.

Cost and Valuation.

Cost.

The method used to ascertain the retail cash price of the superphosphates is as follows:

The sampling agents inquire and note the price at the time each sample is drawn. The analysis when done is reported to each dealer from whom a sample was taken, with an enclosed postal card addressed to the Station, and a request to note on it whether the retail cash price is correctly given and to mail to the Station.

From the data thus obtained the average prices are computed.

Valuation.

The valuation has been computed in all cases in the usual manner as explained on page 16.

Percentage Difference given in the table shows the percentage excess of the cost price over the average retail cost of the nitrogen, phosphoric acid and potash contained in the fertilizer.

This information enables the purchaser to estimate the relative value of the different brands and the relative economy of buying mixed fertilizers or of procuring and compounding the materials needful for a fertilizer.

Which plan is preferable can only be determined by each individual farmer, who should know best what his soil and crops need and what his facilities for purchase and payment are.

In case a fertilizer has sold at two or more different prices, the *manufacturer's price*, when known has been used in calculating percentage difference.

Otherwise an *average, or nearly average price* forms the basis of comparison between cost and valuation. The price thus employed is printed in heavy-faced type.

The average cost of the nitrogenous superphosphates is $32.93. The average valuation is $23.30, and the percentage difference 41.3.

Last year the corresponding figures were :

Average cost $32.99, average valuation $23.48, percentage difference 40.5.

These valuations it must be remembered are based on the assumption that the nitrogen, phosphoric acid and potash in each fertilizer are readily available to farm crops. Chemical examination can show pretty conclusively whether this is true in respect of potash. There is less certainty regarding phosphoric acid, while chemical examination, as it is usually made, gives little or no clue as to the availability of the organic nitrogen of mixed goods. This Station has been for some years engaged in a study of methods for determining approximately the relative availability of nitrogen, and on subsequent pages is given a report of the work done during the past year on this point.

While various inferior or agriculturally worthless forms of nitrogen are in the market the main security of purchasers of mixed fertilizers is in dealing with firms which have an established reputation and in avoiding "cheap" goods offered by irresponsible parties.

Nitrogenous Superphosphates and Guanos, Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealer's Cash Price per Ton.
4464	Pure Fine Bone Dissolved in Sulphuric Acid.	Mapes' Formula & Peruvian Guano Co., N. Y. City.	Mapes' Branch, Hartford.	**$32.00***
4309	Flour of Bone Phosphate.	George W. Miller, Middlefield.	Manufacturer.	**36.00**
4349	Nameless Phosphate.	Danbury Fertilizer Co., Danbury.	L. P. Russell, Orange.	**30.00**
4251	Ammoniated Bone Phosphate.	Preston Fertilizer Co., Greenpoint, L. I.	S. D. Woodruff & Sons, Orange.	**29.00**
4254	Bone, Fish and Potash.	E. R. Kelsey, Branford.	Wilson & Burr, Middletown.	**28.00**
4276	Complete Fertilizer.	Rogers Mfg. Co., Rockfall.	John Lewis. Willimantic.	30.00
			R. H. Tucker, Saybrook.	34.00
				32.00
4178	Formula A.	L. Sanderson, New Haven.	N. E. Smith & Son, Woodmont.	----
			C. O. Jelliff & Co., Southport.	**36.00**
4348	Vegetable Bone Phosphate.	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	J. F. Holmes, Ridgefield.	44.00
			G. S. Butler, Cromwell.	**42.00**
4389	Fish and Potash.	National Fertilizer Co., Bridgeport.	Thomas Kirkham, Newington.	**30.00**
4232	A. A. Ammoniated Superphosphate.	H. J. Baker & Bro., 93 William St., N. Y. City.	D. N. Benton, Guilford.	34.00
			Saxton & Strong, Bristol.	36.00
				35.00
4430	Swift Sure Superphosphate.	M. L. Shoemaker & Co., Philadelphia, Pa.	F. Ellsworth, Hartford.	**38.00**
4224	Complete Manure, A Brand.	Mapes' Formula & Peruvian Guano Co., N. Y. City.	Wheeler & Howes, Bridgeport.	**35.00**
			Will. Foot, Branford.	33.50
			Mapes' Branch, Hartford.	35.00
			Manchester Elevator Co., Manchester.	37.00
			G. K. Nason, Willimantic.	37.00
4188	Complete Manure for General Use.	Mapes' F. & P. G. Co., N. Y. City.	Manchester Elevator Co., Manchester.	40.00
			G. K. Nason, Willimantic.	**38.00**
4179	Standard Phosphate.	Lister Bros., Newark, N. J.	A. N. Clark, Milford.	**32.00**
4386	High Grade General Fertilizer.	Soluble Pacific Guano Co., Boston, Mass.	R. H. Tucker, Saybrook	**39.00**
4364	Fish and Potash.	Leander Wilcox, Mystic.	Manufacturer.	**34.00**
4367	Olds & Whipple Special Phosphate.	Olds & Whipple, Hartford.	Olds & Whipple, Hartford.	**38.00**
4353	Success Phosphate.	Lister Bros., Newark, N. J.	W. H. Parmelee, Essex.	**28.00**
4181	Ammoniated Dissolved Bone.	Lister Bros., Newark, N. J.	A. N. Clark, Milford.	**30.00**
4390	Ammoniated Bone Phosphate.	National Fertilizer Co., Bridgeport.	T. H. Eldridge, Norwich.	34.00
			G. A. & H. B. Williams, East Hartford.	**31.00**
			E. B. Clark. Milford.	28.00
			Henry Child, Woodstock.	30.00

* The full-face figure is the one used in calculating the percentage difference.

Analyses.

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		Guaranteed.
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	
$31.64	1.1	....	....	2.94	2.94	*2.1*	3.47	13.76	3.66	20.89	*12.0*	17.23	....	....	....	....
32.06	12.2	1.18	....	2.07	3.25	*3.0*	8.29	3.10	.66	12.05	*11.0*	11.39	....	8.18	8.18	*7.0*
26.47	13.3	....	....	3.62	3.62	*2.1*	....	7.26	3.38	10.64	*8.0*	7.26	....	4.15	4.15	*2.0*
25.38	14.2	....	.30	2.93	3.23	*2.5*	6.26	3.03	.61	9.90	*9.0*	9.29	....	.81	2.32	*2.0*
24.35	14.9	....	.89	2.63	3.52	*2.5*	3.84	2.49	.13	6.46	*5.0*	6.33	....	.59	3.74	*3.0*
26.95	18.7	.36	....	2.51	2.87	*2.6*	3.04	6.40	.54	9.98	*10.0*	9.44	....	.72	5.54	*5.0*
29.05	20.4	1.07	.16	2.58	3.81	*3.3*	4.74	2.77	1.89	9.40	*10.0*	7.51	*7.0*	1.20	6.16	*6.0*
33.38	25.8	.90	....	4.82	5.72	*5.0*	4.82	1.40	.29	6.51	*7.0*	6.22	*6.0*	6.11	6.11	*6.0*
23.66	26.7	....	....	2.64	2.64	*3.0*	4.86	3.11	1.64	9.61	*6.0*	7.97	....	4.42	4.42	*4.0*
27.55	27.0	.38	1.61	1.30	3.29	*2.5*	5.31	4.68	2.81	12.80	*10.0*	9.99	....	3.20	3.20	*2.0*
29.89	27.1	.84	....	2.04	2.88	*2.5*	7.10	5.53	1.76	14.39	*14.0*	12.63	*9.0*	.59	4.47	*4.0*
27.32	28.1	.74	.39	1.90	3.03	*2.5*	7.18	4.34	1.29	12.81	*12.0*	11.52	*10.0*	3.05	3.05	*2.5*
29.12	30.4	1.24	.51	1.97	3.72	*3.3*	4.66	5.28	1.51	11.45	*10.0*	9.94	*8.0*	4.76	4.76	*4.0*
24.17	32.3	....	.41	2.16	2.57	*2.3*	7.94	2.21	2.57	12.72	....	10.15	*10.0*	1.81	1.81	*1.5*
29.45	32.4	1.55	....	2.13	3.68	*3.3*	4.00	5.15	1.15	10.30	*9.0*	9.15	*8.0*	6.82	6.82	*7.0*
25.57	32.9	....	.27	3.48	3.75	*3.3*	3.49	2.56	.47	6.52	*6.0*	6.05	*5.0*	4.96	4.96	*4.0*
28.30	34.2	1.03	.74	1.59	3.36	*2.7*	5.09	6.67	1.61	13.37	*10.0*	11.76	*8.0*	1.00	2.55	*2.0*
20.32	37.7	....	....	1.49	1.49	*1.2*	8.53	1.80	1.95	12.28	....	10.33	*9.5*	1.32	1.91	*2.0*
21.52	39.4	....	.37	1.72	2.09	*1.8*	7.12	2.44	2.31	11.87	....	9.56	*9.0*	1.79	1.79	*1.5*
22.01	40.8	....	.20	2.11	2.31	*1.6*	2.96	6.85	.77	10.58	*9.0*	9.81	*7.0*	2.27	2.27	*2.0*

Nitrogenous Superphosphates and Guanos Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealer's Cash Price per Ton.
4190	High Grade Ammoniated Bone Superphosphate.	The E. Frank Coe Co., 133 Front St., N. Y. City.	E. S. Banks, Southport.	$33 00
			J. O. Fox & Co., Putnam.	**32.00**
4361	Old Reliable Superphosphate.	L. Sanderson, New Haven.	A. B. Morse, Guilford.	**30.00**
4369	Ammoniated Dissolved Bone.	Quinnipiac Co., 92 State St., Boston, Mass.	J. F. Silliman, New Canaan.	**33.00**
4363	Ammoniated Bone Phosphate.	Leander Wilcox, Mystic.	Manufacturer.	34.00
			Browning & Gallup, New London.	**34.00**
4192	Bradley's Superphosphate.	Bradley Fertilizer Co., Boston, Mass.	J. F. Elwood, Greens Farms.	**35.00**
			H. H. Davenport, Pomfret.	34.00
			G. W. Carver & Son, Putnam.	34.00
			Quinnebaug Store, Danielsonville.	36.00
			J. A. Lewis, Willimantic.	35.00
			W. B. Martin, Rockville.	35.00
			Thomas Ryan, Thompson.	34.00
4237	Fish, Bone and Potash for General Gardening.	Read Fertilizer Co., Box 3121, N. Y. City.	W. Tillinghast, Plainfield.	**30.00**
4249	Fish and Potash, Plain Brand.	Quinnipiac Co., Boston, Mass.	J. W. Gardner, Cromwell.	30.00
			S. V. Osborn & Co., Branford.	32.00
				31.00
4217	Hill and Drill Phosphate.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	C. H. Bell, Portland.	37.00
			M. A. Covell, North Grosvenordale.	34.00
			F. Hallock & Co., Birmingham.	**35.00**
4194	Farmers' New Method Fertilizer.	Bradley Fertilizer Co., Boston, Mass.	Quinnebaug Store, Danielsonville.	34.00
			H. H. Davenport, Pomfret.	31.00
			J. A. Lewis, Willimantic.	30.00
			Thomas Ryan, Thompson.	31.00
			G. W. Carver & Son, Putnam.	33.00
				32.00
4368	Fish and Potash, Crossed Fishes Brand.	Quinnipiac Co., Boston, Mass.	D. W. Spencer, Centrebrook.	**36.00**
4253	Russell Coe's Phosphate.	National Fertilizer Co., Bridgeport.	Wilson & Burr, Middletown.	**30.00**
4233	Ammoniated Dissolved Bone.	Bowker Fertilizer Co., Boston, Mass.	E. B. Clark, Milford.	28.00
			M. A. Covell, North Grosvenordale.	**30.00**
4220	Alkaline Bone.	The E. Frank Coe Co., N. Y. City.	J. O. Fox & Co., Putnam.	28.00
			C. H Lounsbury, Seymour.	32.00
				30.00
4396	Fish and Potash.	Williams & Clark Fertilizer Co., N. Y. City.	F. C. Gould, Silver Lane.	**31.00**
4238	Fish and Potash.	The E. Frank Coe Co., N. Y. City.	W. T. Andrew, Orange.	28.00
			D. N. Clark, Shelton.	35.00
				32.00

ANALYSES—*Continued.*

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		Guaranteed.
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	
$22.72	40.8	....	.48	1.65	2.13	*2.0*	7.87	2.20	1.83	11.90	*9.0*	10.07	*9.0*	.41	2.14	*1 8*
21.17	41.7	....	.31	2.03	2.34	*1.6*	1.20	5.35	4.14	10.69	*10.0*	6.55	*8.0*	.94	3.45	*3.0*
23.13	42.6	....	....	2.03	2.03	*1.6*	4.59	6.35	3.03	13.97	*10.0*	10.94	*9.0*	.59	1.90	*2.0*
23.75	43.1	....	.39	2.54	2.93	*2.5*	3.50	3.04	.96	7.50	*7.0*	6.54	*6.0*	5.50	5.50	*5.0*
24.40	43.4	.51	.06	2.28	2.85	*2.3*	6.91	3.35	1.13	11.39	*11.0*	10.26	*9.0*	2.02	2.02	*1.5*
20.85	43.8	.76	....	2.01	2.77	*2.5*	2.64	2.30	.51	5.45	*5.0*	4.94	*4 0*	5.90	5.90	*4.0*
21.48	44.3	....	.20	2.42	2.62	*2.1*	4.27	2.84	.62	7.73	*6.0*	7.11	*4.0*	3.64	3.64	*4.0*
24.20	44.6	1.55	....	1.30	2.85	*2.5*	5.82	4.59	2.61	13.02	*12.0*	10.41	*9.0*	2.02	2.02	*2.0*
22.05	45.1	.50	....	1.77	2.27	*1.6*	5.97	3.32	1.48	10.77	*10.0*	9.29	*8.0*	2.93	2.93	*3.0*
24.77	45.3	....	.35	3.38	3.73	*3.3*	4.35	2.23	.40	6.98	*5.0*	6.58	*4.0*	3.44	3.44	*3.0*
20.39	47.1	....	....	2.39	2.39	*1.7*	2.16	5.64	2.31	10.11	*8.0*	7.80	*6.0*	2.04	2.04	*1.0*
20.37	47.2	1.13	....	1.22	2.35	*1.5*	3.84	4.26	4.63	12.73	*10.0*	8.10	*8.0*	1.59	1.59	*2.0*
20.15	48.8	....	.12	1.37	1.49	*1.0*	6.94	2.89	2.31	12.14	*11.0*	9.83	*9.0*	.53	2.16	*3.0*
20.82	48.8	....	.22	2.20	2.42	*2.5*	4.94	2.52	.43	7.89	*6.0*	7.46	*4.0*	3.30	3.30	*4.0*
21.46	49.1	....	....	2.64	2.64	*3.0*	2.29	4.26	2.70	9.25	*6.0*	6.55	*4 0*	3.52	3.52	*2.0*

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Con.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealer's Cash Price per Ton.
4245	Soluble Pacific Guano.	Soluble Pacific Guano Co., Boston, Mass.	R. H. Tucker, Saybrook.	**$35.00**
			R. F. Woodford, Plainville.	35.00
			Saxton & Strong, Bristol.	36.00
4327	Harvest Home Phosphate.	H. J. Baker & Bro., N. Y. City.	S. J. Hall, Meriden.	**30.00**
4394	Bay State Fertilizer.	Clark's Cove Fertilizer Co., Boston, Mass.	Henry Fields, Newington.	38.00
			John Ballard, Thompson.	**35.00**
			E. White, Rockville.	38.00
4223	Quinnipiac Phosphate.	Quinnipiac Co., Boston, Mass.	J. W. Gardner, Cromwell.	34.50
			F. S. Bidwell, Windsor Locks.	35.00
			D. C. Wood, Stratford.	**35.00**
4346	Fish and Potash, Triangle A Brand.	Bradley Fertilizer Co., Boston, Mass.	A. H. Diamond & Son, Bristol.	**33.00**
4395	Bay State Fertilizer G. G.	Clark's Cove Fertilizer Co., Boston, Mass.	J. M. Burke, South Manchester.	**35.00**
4225	Americus Brand Ammoniated Bone Superphosphate.	Williams & Clark Fertilizer Co., New York City.	J. Bramfield, Portland.	**35.00**
			F. C. Gould, Silver Lane.	33.00
			H. K. Brainard, Thompsonville.	35.00
			Hale, Day & Co., South Manchester.	38.00
			W. B. Martin, Rockville.	35.00
4307	New England Favorite.	John S. Reese & Co., Baltimore, Md.	John Gunn, Groton.	**36.00**
4240	Royal Bone Phosphate.	Williams & Clark Fertilizer Co., N. Y. City.	F. C. Gould, Silver Lane.	**28.50**
			Hale, Day & Co., South Manchester.	35.00
4248	Standard Phosphate.	Read Fertilizer Co., N. Y. City.	W. Tillinghast, Plainfield.	**30.00**
			J. H. Blackman, Stratford.	30.00
4260	Farmers' Reliable Phosphate.	Chicopee Guano Co., N. Y. City.	F. J. Newton, Branford.	30.00
			H. D. Archer, Southport.	36.00
				33.00
4191	New Rival Superphosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	G. F. Kibbie, Tolland.	**31.00**
			John S. Wells, Hebron.	31.00
4258	Alkaline Guano.	Clark's Cove Fertilizer Co., Boston, Mass.	A. C. Innis, Stratford.	**30.00**
			J. M. Burke, South Manchester.	30.00
4370	Four Fold Brand.	Walker, Stratman & Co., Pittsburgh, Pa.	W. T. Dudley, Guilford.	**30.00**
4371	Vegetable, Vine and Fruit Manure.	Read Fertilizer Co., N. Y. City.	H. L. Foot, Brookfield Junction.	**38.00**
4244	Standard Fertilizer.	Standard Fertilizer Co., Boston, Mass.	Arnold Warner, South Coventry.	**36.00**
4195	Sure Crop Phosphate.	Bowker Fertilizer Co., Boston, Mass.	W. Tillinghast, Plainfield.	30.00
			John A. Paine, Danielsonville	**28.00**
4241	Economical Fertilizer.	Wilkinson & Co., 52–54 William St., N. Y. City.	W. W. Peck, Woodbridge.	**32.00**

ANALYSES—*Continued.*

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		Guaranteed.
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	
$23.42	49.4	.23	....	2.30	2.53	*2.3*	4.77	5.76	1.33	11.86	*10.5*	10.53	*8.5*	1.83	1.83	*2.0*
20.06	49.5	....	.84	.92	1.76	*.9*	2.50	6.59	2.76	11.85	*8.0*	9.09	....	2.35	2.35	*2.0*
23.04	51.9	.68	....	2.04	2.72	*2.5*	5.39	4.28	1.15	10.82	*9.5*	9.67	*8.0*	2.09	2.09	*2.0*
22.98	52.3	.71	.08	1.85	2.64	*2.5*	4.90	4.98	1.63	11.51	*10.0*	9.88	*9.0*	1.96	1.96	*2.0*
21.58	52.9	....	.16	2.33	2.49	*2.0*	3.54	3.08	.83	7.45	*6.0*	6.62	*4.0*	4.87	4.87	*4.0*
22.88	52.9	....	.12	2.23	2.35	*1.9*	5.57	4.68	1.08	11.33	*10.0*	10.25	*8.5*	2.12	2.12	*2.0*
22.85	53.2	.74	....	1.92	2.66	*2.5*	5.92	3.51	1.47	10.90	*10.0*	9.43	*9.0*	2.28	2.28	*2.0*
23.40	53.8	....	.20	2.73	2.93	*2.5*	3.97	5.27	.94	10.18	*10.0*	9.24	*9.0*	1.78	1.78	*2.0*
17.76	60.4	....	....	1.33	1.33	*1.0*	5.31	3.71	1.36	10.38	*8.0*	9.02	*7.0*	2.06	2.06	*2.0*
18.43	62.7	....	....	1.14	1.14	*.8*	6.72	1.99	.69	9.40	*10.0*	8.71	*8.0*	4.09	4.09	*4.0*
19.86	66.1	....	....	1.95	1.95	*1.7*	5.82	2.89	1.75	10.46	*10.0*	8.71	*8.0*	1.98	1.98	*2.0*
18.55	67.1	....	....	1.40	1.40	*1.2*	6.05	3.47	1.47	10.99	*11.0*	9.52	*10.0*	1.89	1.89	*1.6*
17.83	68.2	....	....	1.49	1.49	*1.5*	3.49	4.72	1.59	9.80	*7.0*	8.21	*6.0*	2.56	2.56	*2.0*
17.58	70.6	....	....	1.47	1.47	*1.6*	4.66	3.59	3.07	11.32	*10.0*	8.25	*8.0*	1.52	1.52	*2.0*
22.02	72.5	.29	....	1.78	2.07	*1.6*	5.31	1.40	.31	7.02	*7.0*	6.71	*6.0*	7.29	7.29	*8.0*
20.66	74.2	.35	....	1.80	2.15	*2.0*	6.21	3.06	1.09	10.36	*10.0*	9.27	*8.0*	1.91	1.91	*2.0*
15.24	83.7	.69	....	.37	1.06	*.7*	2.18	6.19	3.20	11.57	*10.0*	8.37	*8.0*	1.04	1.25	*1.0*
14.22	125.0	....	....	1.08	1.08	*1.2*	4.80	1.52	.55	6.87	*6.0*	6.32	....	2.86	2.86	*3.0*

Nitrogenous Superphosphates, Guanos and Fertilizers Sampled and Sent by the Manufacturers.

Station No.	Name or Brand.	Manufacturer.	Sampled by	Manufacturer's Price per Ton.	Valuation per Ton.	Percentage Diff. per Ton.	Nitrogen.					Phosphoric Acid.							Potash.	
							Nitric Nitrogen.	Ammonic Nitrogen.	Organic Nitrogen.	Total. Found.	Total. Guaranteed.	Water-soluble.	Citrate-soluble (Reverted).	Insoluble.	Total. Found.	Total. Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.
4404	Fish and Potash, Anchor Brand.	Bradley Fertilizer Co.	Manufacturer.	$ --	$26.57	--	--	--	3.91	3.91	*2.2*	3 39	3.83	.87	8.09	*5.0*	7.22	*3.0*	3.74	*3.0*
4403	B. D. Sea Fowl Guano.	Bradley Fertilizer Co.	"	--	26.19	--	--	--	2.97	2.97	*2.1*	6.16	5.50	1.25	12 91	*10.0*	11.66	*8.0*	1.40	*1.5*
4402	Original Coe's Superphosphate.	Bradley Fertilizer Co.	"	--	23.48	--	.17	--	2.45	2.62	*1.7*	6.24	4.40	1.04	11.68	*12.0*	10.64	*10.0*	1.30	*1.0*
4408	Great Planet A Fertilizer.	Clark's Cove Fertilizer Co.	"	--	31.12	--	1.30	.22	2.18	3.70	*3.3*	4.53	5.07	1.08	10.68	*9.0*	9.60	*8.0*	7.77	*7.0*
4401	Gold Brand Excelsior Guano.	E. F. Coe Co.	"	--	24.72	--	--	.69	1.23	1 92	--	7.50	2.74	1.31	11.55	--	10.24	--	4.87	--
4406	Cumberland Superphosphate.	Cumberland Bone Phosphate Co.	"	--	23.78	--	.61	--	2.11	2.72	*2.06*	5.98	3.32	1.01	10.31	*10.0*	9.30	*8.0*	3.24	*2.0*
4414	Extra Bone Phosphate.	L. B. Darling Fertilizer Co.	"	--	24.17	--	.72	--	1.49	2.21	--	6.19	4.12	.62	10.93	--	10.31	--	4.84	--
4412	Pine Island Phosphate.	Quinnipiac Co.	"	--	23.53	--	.11	--	2.43	2.54	*2 06*	5.74	5.00	1.13	11.87	*10.0*	10.74	*9.0*	1.53	*1.0*
4411	Standard Complete Manure.	Standard Fertilizer Co.	"	--	30.87	--	1.24	.30	2.12	3.66	*3.30*	4.51	4 97	1.01	10.49	--	9.48	*8.0*	7.79	--
4399	Banner Fertilizer.	Walker, Stratman & Co.	"	--	21.23	--	--	--	2.69	2 69	*2.0*	5.71	3.16	.85	9.72	*11.0*	8.87	*9.0*	.68	*1.0*
4424	Ammoniated Bone Superphosphate.	Crocker Fertilizer Co.	"	--	23.32	--	--	--	2.49	2.49	*2.9*	7.38	3.43	.91	11.72	*11.0*	10.81	*10.0*	1.24	*1.0*
4425	Ammoniated Practical Superphosphate.	Crocker Fertilizer Co.	"	--	15.32	--	--	--	--	1.06	*.82*	4.29	4.20	1.34	9.83	*9.0*	8.49	*8.0*	1.21	*1.0*

Nitrogenous Fertilizer Sampled by Consumer.

4294	Market Garden Manure.	Quinnipiac Co., Boston, Mass.	Josiah Hawkins, Southport, from stock of C. F. Godfrey.	--	$29.74	--	.86	.55	1.94	3.35	*3.3*	2.59	7.12	1.93	11.64	*9.0*	9.71	*8.0*	6.97	*7.0*

2. Sampled by the Manufacturers.

In the preceding table, page 44, are twelve analyses made on samples deposited with the Director of the Station by manufacturers in compliance with the requirements of the Fertilizer Law.

The brands named were not found in the Connecticut market by our sampling agents.

3. Sampled by the consumer.

A single analysis of a sample of this kind is given in the preceding table, page 44.

Protest was made by the manufacturers of the two brands named below because the analyses (first made and here given) did not represent the general quality of the goods. In case of Swift Sure Superphosphate it was possible to draw and analyze a second sample, with the results given in the table on page 39 No. **4430,** which are copied below for comparison.

4242. Complete Bone Phosphate, made by L. Wilcox, Mystic, sampled from stock of Browning & Gallup, New London.

4256. Swift Sure Superphosphate, made by L. Shoemaker & Co., Phila., sampled from stock of J. P. Barstow & Co., Norwich.

ANALYSES.

	4242	4256	4430
Nitrogen as nitrate	----	.70	.84
Nitrogen, organic	1.96	1.80	2.04
Total nitrogen	1.96	2.50	2.88
Water-soluble phosphoric acid	7.23	5.39	7.10
Citrate-soluble (reverted) phosphoric acid	2.90	4.96	5.53
Insoluble phosphoric acid	.68	4.39	1.76
Total phosphoric acid	10.81	14.74	14.39
Potash, as muriate	2.49	4.47	4.47
Valuation per ton	$21.63	26.40	29.89

III. SPECIAL MANURES.

1. *Sampled by Station Agent.*

For Analyses and Valuations see pages 46 *to* 53.

Here are included such Nitrogenous Superphosphates as are claimed by their manufacturers to be specially adapted to the needs of particular crops.

Special Manures Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' Cash Price per Ton.
4385	The Rogers & Hubbard Co.'s Soluble Tobacco Manure.	Rogers & Hubbard Co., Middletown.	T. S. Loomis, Windsor. G. S. Butler, Cromwell.	***42.00** 42.00
4355	Seeding Down Manure.	Mapes' Formula & Peruvian Guano Co., New York.	Mapes' Branch, Hartford.	**37.50**
4235	Special Fertilizer for Fruit, Vegetables and Tobacco.	Armour Packing Co., Kansas City, Kansas.	F. C. Vibert, Hockanum.	**35.00**
4272	Potato Manure.	Danbury Fertilizer Co., Danbury.	S. D. Woodruff & Sons, Orange. L. P. Russell, Orange.	**35.00** 35.00
4177	Fairchild's Formula for Corn and General Crops.	Rogers & Hubbard Co., Middletown.	F. T. Bradley, Saybrook.	**46.00**
4176	The Rogers & Hubbard Co.'s Soluble Potato Manure.	Rogers & Hubbard Co., Middletown.	F. T. Bradley, Saybrook.	**38.00**
4373	The Rogers & Hubbard Co.'s Fertilizer for Oats and Top Dressing.	Rogers & Hubbard Co., Middletown.	G. S. Butler, Cromwell.	**50.00**
4374	The Rogers & Hubbard Co.'s Grass and Grain Fertilizer.	Rogers & Hubbard Co., Middletown.	G. S. Butler, Cromwell.	**37.50**
4372	High Grade Corn Fertilizer.	The Rogers Mfg. Co., Rockfall.	W. H. Warner, Wethersfield.	**48.00**
4231	Onion Manure.	H. J. Baker & Bro., New York.	C. O. Jelliff & Co., Southport.	**39.00**
4250	Quinnipiac Havana Tobacco Fertilizer.	Quinnipiac Co., Boston, Mass.	J. W. Gardner, Cromwell.	**48.00**
4265	Soluble Potato and General Crop Manure.	The Rogers Mfg. Co., Rockfall.	R. H. Tucker, Saybrook. W. H. Warner, Wethersfield. F. Hallock, Birmingham.	39.00 **38.00** 38.00
4392	Wrapper Brand Tobacco Manure.	Mapes' F. & P. G. Co., New York.	Mapes' Branch, Hartford.	**48.00**
4350	Tobacco Grower.	L. B. Darling Fertilizer Co., Pawtucket, R. I.	F. S. Bidwell, Windsor Locks.	**40.00**
4234	Potato Manure.	H. J. Baker & Bro., New York.	D. N. Benton, Guilford. C. O. Jelliff & Co., Southport. Saxton & Strong, Bristol.	**40.00** 38.00 41.00
4354	Tobacco Starter.	Mapes' F. & P. G. Co., New York.	Mapes' Branch, Hartford.	**35.00**
4325	Complete Manure for Corn and Grain.	Bradley Fertilizer Co., 92 State St., Boston, Mass.	M. Beach & Son, New Milford. Lewis & Judson, Stratford. Strong & Tanner, Winsted.	40.00 38.00 **38.00**
4216	Complete Manure for Light or Sandy Soils.	Mapes' F. & P. G. Co., New York City.	C. O. Jelliff & Co., Southport. Mapes' Branch, Hartford. G. K. Nason, Willimantic.	40.00 **42.00** 44.00
4236	Stockbridge Tobacco Manure.	Bowker Fertilizer Co., Boston, Mass.	H. K. Brainard, Thompsonville.	**50.00**

* Where several quotations are made the full-face figure indicates the one used in calculating the percentage difference.

Analyses.

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	Guaranteed.
$42.91	*2.1	1.15	.20	4 52	5.87	*5.0*	2.05	5.80	.25	8.10	*10.0*	7.85	----	.28	10.40	*10.0*
36.83	1.8	.99	.16	1.16	2.31	*2.5*	----	----	----	18.01	*18.0*	----	----	11.73	11.73	*10.0*
32.73	6.9	----	----	----	6.94	*7.4*	-- -	----	----	11.17	*9.16*	----	----	----	----	----
31.68	10.4	----	----	4.03	4.03	*2.9*	----	7.75	3.03	10.78	*8.0*	7.75	----	7.81	7.81	*7.0*
41.33	11.2	4.21	----	1.70	5.91	*5.5*	----	---	----	13.01	*12.0*	----	----	12.16	12.16	*12.5*
34.05	11.6	1.25	----	4.22	5.47	*5.0*	1.74	6.29	.85	8.88	*10.0*	8.03	----	.77	5.54	*5.0*
43.70	14.4	7.62	----	1.58	9.20	*8.8*	--	----	----	8.88	*7.9*	----	----	8.75	8.75	*8.4*
32.55	15.2	----	----	----	3.32	*2.5*	----	----	----	17.24	*16.0*	----	----	11.44	11.44	*12.5*
41.66	15.2	4.14	----	2.02	6.16	*5.5*	----	----	----	12.35	*13.0*	----	----	13.01	13.01	*14.0*
33.46	16.5	----	4.21	.51	4.72	*4.9*	4.05	1.00	.54	5.59	----	5.05	*4.5*	9.49	10.30	*9.0*
41.17	16.5	----	3.09	3.21	6.30	*5.8*	.42	3.66	1.10	5.18	*6.0*	4.08	*5.0*	.85	11.25	*10.0*
32.47	17.0	.69	----	3.06	3.75	*3.1*	2.40	6.26	.78	9.44	*10.0*	8.66	----	.77	8.75	*9.0*
40.99	17.1	1.50	2.96	1.85	6.31	*6.2*	.35	5.43	.19	5.97	*4.5*	5.78	----	1.28	11.68	*10.5*
34.09	17.3	----	.69	2.67	3.36	*4.9*	5.01	4.41	1.20	10.62	*10.0*	9.42	----	2.00	10.05	----
33.66	18.8	.46	2.15	1.57	4.18	*3.3*	3.44	2.52	2.18	8.14	----	5.96	*5.0*	4.61	10.73	*10.0*
29.26	19.6	.82	.43	1.90	3.15	*2.5*	6.85	5.41	.98	13.24	*12.0*	12.26	*8.0*	----	3.48	*2.5*
31.52	20.5	1.54	----	2.00	3.54	*3.3*	4.27	10.38	2.72	17.37	*13.0*	14.65	*12.0*	2.24	2.24	*3.0*
34.02	23.4	1.59	1.33	2.42	5.34	*4.9*	3.39	4.30	1.21	8.90	*8.0*	7.69	*6.0*	6.80	6.80	*6.0*
40.49	23.4	3.11	----	2.86	5.97	*5.8*	.58	5.90	4.75	11.23	*4.0*	6.48	----	.52	11.31	*10.0*

* Valuation exceeds cost.

Special Manures, Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' Cash Price per Ton.
4326	Tobacco Manure.	H. J. Baker & Bro., New York.	E. F. Hawley, Newtown.	$42.50
4222	Corn Manure.	Mapes' F. & P. G. Co., New York.	G. K. Nason, Willimantic.	41.00
			Mapes' Branch, Hartford.	**39.00**
			Will. Foot, Branford.	38.50
4391	Grass and Grain Spring Top Dressing.	Mapes' F. & P. G. Co., New York.	J. P. Barstow & Co., Norwich.	40.00
			Birdsey & Foster, Meriden.	40.00
			Southington Lumber & Feed Co.	40.00
			Mapes' Branch, Hartford.	**39.00**
			G. K. Nason, Willimantic.	40.00
4197	Stockbridge Top Dressing.	Bowker Fertilizer Co., Boston, Mass	John A. Paine, Danielsonville.	40.00
			John Lewis, Willimantic.	**40.00**
4243	Potato, Onion and Tobacco Manure.	Leander Wilcox, Mystic.	Browning & Gallup, New London.	**36.00**
4219	Complete Manure for Potatoes and Vegetables.	Bradley Fertilizer Co., Boston, Mass.	J. F. Elwood, Greens Farms.	**38.00**
			Buckley & Hanmer, Wethersfield.	38.00
			Lewis F. Judson, Stratford.	38.00
			J. C. Lincoln, Berlin.	38.00
4310	Peerless Potato Manure.	Walton & Whann Co., Wilmington, Del.	W. S. Hill, Southford.	**38.00**
4221	Potato Manure.	Mapes' F. & P. G. Co., New York.	Wilson & Burr, Middletown.	42.00
			G. K. Nason, Willimantic.	43.00
			Manchester Elevator Co., Manchester.	43.00
			Mapes' Branch, Hartford.	**41.00**
			Wheeler & Howes, Bridgeport.	45.00
4384	High Grade Special for Potatoes, Tobacco, Onions and Cabbage.	Williams & Clark, 81 Fulton St., N. Y. City.	J. Bransfield, Portland.	40.00
			F. C. Gould, Silver Lane.	**39.00**
			Hale, Day & Co., South Manchester.	42.00
			S. D. Woodruff & Sons, Orange.	37.00
4180	Potato Manure.	Lister's Agricultural Chemical Works, Newark, N. J.	A. N. Clark, Milford.	**38.00**

Analyses.

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	Guaranteed.
$34.28	23.9	- --	2.50	1.88	4.38	*4.5*	4.59	.83	.40	5.82	----	5.42	*3.5*	.49	10.78	*10.0*
31.39	24.2	1.44	.60	1.92	3.96	*3.7*	5.95	3.93	1.40	11.28	*10.0*	9.88	*8.0*	6.46	6.46	*6.0*
30.74	26.8	2.01	.88	1.90	4.79	*4.1*	3.71	4.09	.55	8.35	*7.0*	7.80	*5.0*	5.97	5.97	*5.0*
31.47	27.1	3.11	----	2.02	5.13	*5.0*	2.90	3.71	3.07	9.68	*6.0*	6.61	*4.0*	6.88	6.88	*6.0*
28.07	28.2	.76	.30	2.46	3.52	*3.3*	4.22	3.31	1.25	8.78	*8.0*	7.53	*7.0*	1.54	6.34	*6.0*
29.30	29.6	1.50	.05	2.18	3.73	*3.7*	4.61	4.37	1.63	10.61	*9.0*	8.98	*8.0*	6.33	6.33	*6.0*
29.28	29.7	1.60	.06	1.62	3.28	*3.3*	6.24	1.07	.30	7.61	*7.0*	7.31	----	10.70	10.70	*9.0*
31.27	31.1	2.16	.46	1.31	3.93	*3.7*	4.50	3.83	1.00	9.33	*8.0*	8.33	*8.0*	.89	8.12	*6.0*
29.38	32.7	1.32	----	2.20	3.52	*3.7*	3.68	5.70	1.14	10.52	*8.0*	9.38	*7.0*	6.95	6.95	*7.0*
28.54	33.1	1.57	.29	1.83	3.69	*3.7*	6.30	1.86	.76	8.92	----	8.16	*7.5*	6.89	6.89	*7.0*

Special Manures, Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealer's Cash Price per Ton.
4270	Corn Fertilizer.	M. E. Wheeler & Co, Rutland, Vermont.	P. Rourke, Orange.	------
			S. J. Peck, Woodbridge.	$32.00
4257	Special Phosphate for Potatoes.	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	G. S. Butler, Cromwell.	40.00
			Will. Foot, Branford.	40.00
4351	Wheat and Corn Phosphate.	Darling Fertilizer Co., Pawtucket, R. I	Treat & Clark, Orange.	32.00
4196	Stockbridge Potato Manure.	Bowker Fertilizer Co., Boston, Mass.	A. M. Williams, Manchester.	40.00
			J. A. Lewis, Willimantic	40.00
			M. A. Covell, No. Grosvenor Dale.	38.00
				39.00
4255	Vegetable, Vine and Tobacco Fertilizer.	Great Eastern Fertilizer Co., Rutland, Vermont.	C. Grant, Buckland.	33.00
			G. L. Beach, Branford.	33.00
			S. C. Lewis, Stratford.	33.00
4187	Potato, Hop and Tobacco Phosphate.	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	G. F. Kibbie, Tolland.	35.00
			John S. Wells, Hebron.	34.00
4275	Potato and Root Crop Manure.	Darling Fertilizer Co., Pawtucket, R. I.	F. S. Bidwell, Windsor Locks.	38.00
			Treat & Clark, Orange.	37.00
			S. W. Bray, Milford.	40.00
4218	Stockbridge Corn Manure.	Bowker Fertilizer Co., Boston, Mass.	J. F. Hutchinson, Windsor.	41.00
			John A. Paine, Danielsonville.	40.00
			J. A. Lewis, Willimantic.	40.00
4269	High Grade Potato Manure.	M. E. Wheeler & Co., Rutland, Vermont.	S. J. Peck, Woodbridge.	34.00
4262	Tobacco Fertilizer.	Bradley Fertilizer Co., Boston, Mass.	M. Beach & Son, Milford.	40.00
			A. C. Sternberg, Hartford.	40.00
4247	Special Potato Manure.	J. S. Reese & Co., Baltimore, Md.	Donald Gunn, Groton.	38.00
4264	General Fertilizer for Grass and Grain.	Great Eastern Fertilizer Co., Rutland, Vt.	S. C. Lewis, Stratford.	33.00
			F. Morton, Rocky Hill.	34.00
			C. Grant, Buckland.	33.00
4261	Potato Manure.	Chicopee Guano Co., 140 Maiden Lane, N. Y. City.	H. D. Archer, Southport	38.00
			F. J. Newton, Branford.	35.00
				36.50
4193	High Grade Potato Fertilizer.	E. Frank Coe Co., 133 Front St., N. Y. City.	E. S. Banks, Southport.	36.00
			J. O. Fox, Putnam.	
4429	High Grade Potato Fertilizer.	E. Frank Coe Co, 133 Front St., N. Y. City.	I. W. Dennison & Co., Mystic.	35.00
4189	Ammoniated Wheat and Corn Phosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	G. F. Kibbie, Tolland.	33.00
			John S. Wells, Hebron.	32.00
4366	Americus Potato and Tobacco Manure.	Williams & Clark Fertilizer Co., N. Y.	F. C. Gould, Silver Lane.	33.00

Analyses.

Valuation per Ton.	Percentage Diff. between Cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen.		Soluble.	Reverted.	Insoluble.	Total.		Available.		Found.		Guaranteed.
					Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	
23.87	34.0	.80	---	2.52	3.32	*1.7*	6.56	1.80	.85	9.21	*9.0*	8.36	*8.0*	2.27	2.27	*2.0*
29.58	35.2	----	----	3.88	3.88	*3.7*	7.06	1.29	.30	8.65	*9.0*	8.35	*8.0*	5.79	5.79	*5.4*
23.44	36.5	----	----	2.15	2.15	*2.1*	5.76	4.91	2.25	12.92	*9.0*	10.67	----	2.52	2.52	*2.0*
28.49	36.8	2.04	----	1.52	3.56	*3.3*	6.19	2.50	1.86	10.55	*8.0*	8.69	*6.0*	6.70	6.70	*7.0*
23.59	39.8	.52	----	1.67	2.19	*2.1*	6.16	2.30	1.35	9.81	*9.0*	8.46	*8.0*	6.05	6 05	*6.0*
24.14	40.8	----	----	2.30	2.30	*2.0*	7.31	2.73	1.22	11.26	*11.0*	10.04	*10.0*	3.74	3.74	*3.3*
26.88	41.3	.37	.11	2.34	2.82	*2.9*	3.38	4.51	1.70	9.59	*10.0*	7.89	*6.0*	3.18	7.15	*7.0*
28.13	42.1	1.81	----	1.70	3.51	*3.3*	5.41	5.11	2.07	12.59	*10.0*	10.52	*8.0*	4.05	4.05	*4.0*
23.90	42.2	.25	----	1.94	2.19	*2.1*	5.52	2.99	1.89	10.40	*9.0*	8.51	*8.0*	5.91	5.91	*3.8*
27.76	44.0	1.29	----	2.25	3.54	*3.3*	4.48	4.52	1.68	10.68	*10.0*	9.0	*8.0*	5.19	5.19	*7.4*
26.33	44.3	----	.16	2.81	2.97	*3.0*	2.90	4.82	.97	8.69	*7.0*	7.72	*7.0*	6.83	6.83	*7.5*
22.86	44.3	.75	----	2.28	3.03	*2.9*	6.54	1.85	.86	9.25	*9.0*	8.39	*8.0*	2.23	2.23	*2.0*
25.01	45.9	.60	.16	2.20	2.96	*2.9*	5.68	2.17	1.45	9.30	*9.0*	7.85	*7.0*	5.25	5.25	*5.0*
24.29	48.2	----	.27	1.90	2.17	*2.0*	6.74	2 02	1.50	10.26	*10.0*	8.76	*8.0*	.65	5.15	*6.0*
----	----	----	----	----	----	----	----	----	----	----	----	----	----	.60	4.88	----
22.07	49.5	----	----	2.24	2.24	*2.0*	7.28	2.54	1.18	11.00	*11.0*	9.82	*10.0*	1.97	1.97	*1.6*
22.06	49.5	.35	----	1.89	2.24	*2.5*	7.17	2.12	.55	9.84	*9.0*	9.29	*8.0*	1.61	2.99	*3.0*

SPECIAL MANURES, SAMPLED BY THE STATION.—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' Cash Price per Ton.
4324	Complete Manure for Top Dressing Grass and Grain	Bradley Fertilizer Co., Boston, Mass.	F. S. Bidwell, Windsor Locks.	39.00
			J. F. Elwood, Greens Farms.	**38.00**
4393	Tobacco Grower.	Bowker Fertilizer Co., Boston, Mass.	M. McNamara, New Milford.	**39.00**
4246	Special Potato Manure.	Soluble Pacific Guano Co., Boston, Mass.	J. Bramfield, Portland.	**35.00**
			R. F. Woodford, Plainville.	35.00
4365	Americus Corn Phosphate.	Williams & Clark Fertilizer Co., N. Y. City.	W. B. Martin, Rockville.	**35.00**
4388	Potato Manure.	Quinnipiac Co., Boston, Mass.	S. V. Osborn & Co., Branford.	38.00
			J. W. Gardner, Cromwell.	35.00
			D. C. Wood, Stratford.	**36.00**
4239	Potato Phosphate.	Williams & Clark Fertilizer Co., N. Y. City.	Hale, Day & Co., So. Manchester.	38.00
			W. B. Martin, Rockville.	**35.00**
			F. C. Gould, Silver Lane.	33.00
			J. Bramfield, Portland.	35.00
			D. N. Benton, Guilford.	33.00
			H. K. Brainard, Thompsonville.	38.00
4387	Potato Manure.	Preston Fertilizer Co., Greenpoint, L. I.	W. J. Anderson, Danbury.	**38.00**
4259	Potato and Tobacco Fertilizer.	Clark's Cove Fertilizer Co., Boston, Mass.	J. M. Burke, So. Manchester	**37.00**
4198	Potato Manure.	Bradley Fertilizer Co., Boston, Mass.	J. F. Elwood, Greens Farms.	**36.00**
			Quinebaug Store, Danielsonville.	38.00
			H. H. Davenport, Pomfret.	35.00
			G. W. Carver & Son, Putnam.	36.00
			J. A. Lewis, Willimantic.	38.00
			Thomas Ryan, Thompson.	34.00
4347	Bay State Potato Manure.	Clark's Cove Fertilizer Co., Boston, Mass.	E. White, Rockville.	38.00
			John Ballard, Thompson.	**35.00**
4362	Potato and Tobacco Fertilizer.	Standard Fertilizer Co., Boston, Mass.	Arnold Warner, So. Coventry.	**38.00**
4230	Potato Manure.	Bowker Fertilizer Co., Boston, Mass.	W. Tillinghast, Plainfield.	34.00
4352	Oats, Buckwheat, and Seeding Down Manure.	Great Eastern Fertilizer Co., Rutland, Vt.	P. Campbell, Sandy Hook.	**35.00**
			F. W. Button, Thompsonville.	----
4308	Potato Special.	Walker, Stratman & Co., Pittsburgh, Pa.	W. T. Dudley, Guilford.	**40.00**
4397	Grass and Oats Fertilizer.	M. E. Wheeler & Co., Rutland, Vt.	S. J. Peck, Woodbridge.	**28.00**

ANALYSES.—*Continued.*

Valuation per Ton.	Percentage Diff. between cost and Valuation.	Nitrogen.					Phosphoric Acid.							Potash.		
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen. Found.	Total Nitrogen. Guaranteed.	Soluble.	Reverted.	Insoluble.	Total. Found.	Total. Guaranteed.	Available. Found.	Available. Guaranteed.	Found. As Muriate.	Found. Total.	Guaranteed.
25.30	50.1	5.20	....	....	5.20	*5.0*	2.35	3.97	1.01	7.33	*6.0*	6.32	*5.0*	.60	2.59	*2.5*
25.75	51.4	1.08	....	1.66	2.74	*2.5*	6.42	4.27	1.05	11.74	*9.0*	10.69	*7.0*	.44	3.54	*4.5*
22.44	55.9	.65	.13	1.83	2.61	*2.5*	2.72	4.24	2.03	8.99	*7.0*	6.96	*5.0*	5.07	5.07	*5.0*
22.66	57.2	.48	....	1.71	2.19	*2.1*	6.08	4.53	1.22	11.83	*10.5*	10.61	*9.0*	1.97	1.97	*1.5*
22.83	57.6	.81	.11	1.74	2.66	*2.5*	2.74	4.82	1.37	8.93	*7.0*	7.56	*6.0*	4.98	4.98	*5.0*
22.11	58.3	.83	....	1.75	2.58	*2.5*	3.81	3.12	1.50	8.43	*7.0*	6.93	*6.0*	5.13	5.13	*5.0*
23.53	61.4	....	.31	1.01	1.32	*3.3*	5.72	4.29	1.03	11.04	*8.0*	10.01	....	3.79	6.85	*7.0*
22.80	62.2	....	....	2.35	2.35	*2.1*	5.52	4.68	2.00	12.20	*9.0*	10.20	*8.0*	1.70	1.70	*3.0*
21.93	64.1	.99	....	1.63	2.62	*2.5*	4.64	2.47	1.03	8.14	*8.0*	7.11	*6.0*	4.81	4.81	*5.0*
21.26	64.6	1.17	....	1.45	2.62	*2.5*	3.60	2.86	.97	7.43	*7.0*	6.22	*6.0*	5.15	5.15	*5.0*
21.37	77.7	.71	....	1.44	2.15	*2.1*	5.49	3.94	1.60	11.03	*9.0*	9.43	*8.0*	2.69	2.69	*3.0*
18.90	79.8	.81	....	.99	1.80	*1.5*	3.54	5.24	2.80	11.58	....	8.78	*11.0*	1.96	1.96	*2.0*
18.10	93.3	....	....	1.12	1.12	*.8*	7.01	1.61	.58	9.20	*9.0*	8.62	*8.0*	3.94	3.94	*4.0*
19.88	101.2	....	.12	1.35	1.47	*2.4*	5.78	1.65	2.80	10.23	*12.0*	7.43	*10.0*	5.05	5.05	*5.4*
13.80	102.8	....	....	....	....	....	6.96	3.13	.50	10.59	*12.0*	10.09	*10.0*	2.01	2.01	*2.0*

Guarantees.

Of the sixty brands of Special Manures analyzed, twenty-six are quite below the manufacturer's minimum guarantee in respect of one ingredient, four are below in respect of two ingredients and one in respect of all three ingredients. Fully one half therefore are below the manufacturer's guarantee.

Cost, Valuation, and Percentage Difference.

The average cost per ton of the Special Manures has been $38.13. The average valuation, $28.62, and the percentage difference 33.2 per cent. Last year the corresponding figures were, average cost, $37.76, average valuation, $29.35, percentage difference, 28.6 per cent.

Analyses requiring Special Notice.

In the table, page 51 is an analysis of The E. Frank Coe Co's. High Grade Potato Manure, No. **4193.** The sample was drawn from Stock of E. S. Banks, Southport and J. O. Fox & Co., Putnam. Six per cent. of potash is guaranteed by the manufacturer. Protest was made that the sample analyzed, which contained only 5.15 per cent. of potash, did not represent the general quality of the goods. Potash was accordingly determined in another sample of the same brand, **4429,** drawn from Stock of I. W. Dennison & Co., Mystic.

The latter contained 4.88 per cent. of potash of which .60 was in form of muriate. This result confirms the previously made analysis and shows that the goods sold in Southport, Putnam and Mystic were below guarantee in respect to potash.

The "Chemical Compound Fertilizer" for Tobacco and for Corn.

Samples of fertilizers bearing the names given above have been sent to the Station by John Mason of Warehouse Point and A. D. Nooney of Suffield.

Mr. Mason states that orders for these fertilizers were solicited by a traveling agent and we are otherwise informed that the goods were shipped to the purchasers direct from Providence.

They were offered at the modest price of $50.00 per ton, the purchaser to delay payment till the crop was harvested and proved satisfactory.

It was represented that half a ton was enough to raise a crop of tobacco.

4300 and **4417** are samples of the Chemical Compound for tobacco, sampled from stock at the warehouse of F. S. Bidwell by John Mason, Warehouse Point and A. D. Nooney, Suffield.

4299 is a sample of the Chemical Compound for Corn, sampled by John Mason, Warehouse Point.

The statement of composition given on the tags which were attached to the packages were as follows:

	For Tobacco.	*For Corn.*
Nitrogen	4.21	1.46
Phosphoric acid soluble in the soil	15.75	16.36
Alkali	21.37	24.54

The tags are also marked from Mason, Chapin & Co. Importers of and Dealers in Dyestuffs, Chemicals, Paints, Oils, etc., Providence, R. I.

Following are the results of analyses of the samples:

	4300	**4417**	**4299**
Nitrogen in nitrates	4.03	3.56	1.47
Phosphoric acid soluble in water	.11	.22	.29
" " "reverted"	2.20	2.38	2.08
" " insoluble	11.51	10.08	13.70
" " total	13.82	12.68	16.07
Potash	none.	none.	none.
Valuation per ton	$18.84	17.23	12.38
Cost per ton	$50.00	50.00	50.00

Further knowledge of the composition of these fertilizers is given by the following complete analyses.

	Chemical Compound Fertilizer for Tobacco.	Chemical Compound Fertilizer for Corn.
	4300	**4299**
Sand and Silica	11.78	12.66
Oxide of Iron and Alumina	6.92	7.96
Lime	13.80	15.50
Magnesia	.16	.10
Potash	.00	.00
Soda	20.75	21.83
Carbonic Acid	10.22	14.13
Sulphuric Acid	.36	.29
Phosphoric Acid	13.82	16.07
Nitric Acid	15.52	5.62
Chlorine	.45	.25
Water by difference	6.22	5.59
	100.00	100.00

The Fertilizer for Tobacco consists of about 24 to 25 per cent. of nitrate of soda, and 20 per cent. of carbonate of soda mixed with some quite insoluble ground phosphate of iron and lime.

The Fertilizer for Corn consists of about 9 to 10 per cent. of nitrate of soda with correspondingly more carbonate of soda and ground phosphate.

The Tobacco Fertilizer is below the guarantee in respect to both nitrogen and phosphoric acid, the Corn Fertilizer in respect to phosphoric acid alone.

A mixture of 500 pounds of nitrate of soda, costing $12.50, 1200 pounds of basic slag costing $11.40 and 300 pounds of dry carbonate of soda, costing $6.00, total cost $29.90, would contain approximately the same quantities of nitrogen, phosphoric acid and soda and would have at least as great a crop-producing power as these fertilizers costing $50.00 per ton.

The only valuable fertilizing ingredients contained in these fertilizers viz: phosphoric acid and nitrogen could however be bought for not far from $20.00, so that the plant food in these goods costs more than twice as much as the farmer needs to pay for it.

It is claimed that the soda existing in these fertilizers as carbonate and nitrate is an efficient substitute for potash in the plant and in the soil. So far as the plant is concerned a large amount of the most refined investigation would appear to demonstrate conclusively that soda cannot in any sense or to any extent take the place of potash in plant-nutrition. Plants growing in presence of abundance of potash usually take up and contain more potash than they really need. This accidental or unnecessary

potash may indeed be replaced by soda but both may be withheld without detriment to the plant. Even the salt-worts and sea-weeds which usually grow in soils or water containing much sodium compounds, flourish equally well in absence of soda, but cannot exist in default of potash.

On the other hand soda may sometimes or often take the place of potash as a fertilizer. In such cases it operates indirectly not by entering itself into the crop as a needful food to the plants but by its action on the soil, making more rapidly available some other ingredient of the soil, it may be potash, or lime or nitrogen, which is there present but exists in a comparatively inert state. It is well established that the use of soda as a fertilizer has often increased crops, but experience shows that it is commonly an uncertain and unsafe application to land. In any case it does not enrich the soil or increase its stores of plant-food, but simply facilitates their solution, consumption and, it may easily be, their waste.

As a rule soils contain more soda than potash and the frequent use of soda in fertilizers tends to exhaust and impoverish the land. If soda is to be used it is most cheaply supplied in nitrate of soda, which by its nitrogen may easily return its entire cost leaving its soda in the soil as carbonate, and if more alkali is useful, lime is vastly cheaper than soda and not a whit less efficacious, is in fact, what soda is not, an essential element of plant-nutrition, as well as the safest and surest means of fluxing the inert plant-food of the soil and putting its hoarded capital into active circulation.

2. *Sampled by Manufacturers and* 3. *Sampled by Consumers.*

2. *Sampled by Manufacturers.*

These samples were sent to the Station in compliance with the terms of the Fertilizer Law and were analyzed because no samples of the brands named were found in market by our sampling agents:

In the same table of analyses with the above is included **4416** Crocker's Ammoniated Wheat and Corn Phosphate.

This analysis was objected to by the manufacturer on account of the low per cent. of nitrogen which he claims does not fairly represent the quality of this brand.

3. *Sampled by Consumers.*

These analyses are included with those of manufacturers in the following table :—

Special Manures, Sampled and Sent by Manufacturers.

Station No.	Name or Brand.	Manufacturer.	Sampled by	Manufacturer's Price per Ton.	Valuation per Ton.	Percentage Diff.	Nitrogen.					Phosphoric Acid.							Potash.	
										Total.					Total.		Available.			
							Nitric Nitrogen.	Ammonic Nitrogen.	Organic Nitrogen.	Found.	Guaranteed.	Water-soluble.	Citrate-soluble (Reverted.)	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
4431	Special Potato Fertilizer.	G. B. Alderman, Suffield.	Manufacturer.	--	$30.03	--	.82	--	2.61	3.43	--	1.65	5.44	.60	7.69	--	7.09	--	9.47	--
4423	Connecticut Wrapper Fertilizer, Pinney Formula.	Cleveland Linseed Oil Co.	"	--	33.88	--	--	--	4 38	4.38	--	--	6 24	.30	6 54	--	6.24	--	10.18	--
4400	Special Tobacco Fertilizer, New England Brand.	E. Frank Coe Co., N. Y.	"	--	33.27	--	--	3.21	1.01	4.22	--	7.73	2.39	1.39	11.51	--	10.12	--	4.63	--
4415	Special Connecticut Tobacco Manure.	The Crocker Fertilizer and Chemical Co.	"	--	45.31	--	.62	--	6 50	7.12	*5.75*	5.84	.76	.13	6.73	*6.0*	6.60	*5.0*	11.11	*10.0*
4405	Potato Phosphate.	Cumberland Bone Phosphate Co., Boston, Mass.	"	--	24.85	--	.33	--	2.33	2.66	*2.06*	6.05	4.18	1.0	11.23	*11.0*	10.23	*9.0*	3.25	*3.0*
4413	Corn Manure.	Quinnipiac Co., Boston, Mass	"	--	26.01	--	.33	--	2.80	3.13	*2.06*	5.63	5.36	1.34	12 33	*10 0*	10.99	*9 0*	1.65	*1.5*
4409	Grass Manure.	Quinnipiac Co.	"	--	28.20	--	6.12	--	--	6.12	*3.91*	.22	6.10	1.23	7.55	*6.0*	6.32	*5.0*	2.90	*2 0*
4407	High Grade Fertilizer for Oats and Top Dressing.	Rogers Manufacturing Co., Rockfall, Conn.	"	--	37.11	--	1.86	--	3.21	5.07	--	3.33	6.40	.40	10.13	--	9.73	--	9.60	--
4398	Tobacco Special.	Walker, Stratman & Co, Pittsburgh, Pa.	"	--	24.47	--	--	--	2.48	2.48	--	7.35	2.24	.70	10.29	--	9.59	--	3.64	--
4410	Grass Manure.	Williams & Clark Fertilizer Co., N. Y. City.	"	--	28.14	--	6.14	--	--	6.14	*3.91*	.17	6.03	1.21	7.41	*6 0*	6.20	*5.0*	2.93	*2.0*
4416	Ammoniated Wheat and Corn Phosphate.	Crocker Fertilizer and Chemical Co.	"	--	20.88	--	--	--	1.83	1.83	*2 0*	7.07	3.31	.94	11.32	*11.0*	10.38	*10.0*	1.79	*1.6*

Special Manures, Sampled and Sent by Consumers.

4160	Chittenden's Complete Grass Fertilizer.	National Fertilizer Co., Bridgeport, Ct.	T. J. Stroud, Shaker Station, Ct.	$36.00	$30.10	*19.6*	trace.	2.54	1.52	4.06	*4.1*	6.05	1.45	2 47	9.97	*8.0*	7.50	*6.0*	5.53	*5.0*
4214	Special Strawberry Manure.	Baker & Bro., N. Y. City.	W. H. Olcott, South Manchester, Ct.	42.50	27.71	*53.4*	--	2.13	1.10	3.23	*2.7*	4.50	1.89	1.50	7.89	--	6.39	*6.0*	8.14	*8.0*
4215	Fruit and Vine Manure.	Mapes F. & P. G. Co., N. Y. City.	W. H. Olcott, South Manchester.	38.00	29.68	*28.1*	.49	.31	1.82	2.62	*1 6*	4.96	2.78	.70	8.44	*7.0*	7.74	*5.0*	10.68	*11.0*
4453	Grass and Grain Fertilizer.	Leander Wilcox, Mystic.	Horatio Willard, Clinton	--	34.86	--	--	--	2.95	2.95	*2.5*	--	--	--	17.01*	*17.0*	---	--	13.38	*13.0*

* In form of Bone.

IV. Home Mixtures.

Here are included fertilizers which have been home-made from chemicals or raw materials bought of wholesale dealers. This method of preparing mixed fertilizers is steadily growing in favor, particularly with those who study most closely the special requirements of their particular soils and crops. The formulas by which the mixtures are made are first given, followed by the analyses, page 60.

Formulas.

	4328	4329	4330	4331	4332	4333	4334
	pounds.	pounds.	pounds.	pounds.	pounds.	pounds.	pounds.
Nitrate of Soda	----	100	300	200	200	200	100
Sulphate of Ammonia	50	----	200	----	----	----	----
Dried Blood	----	----	----	----	----	----	100
Blood, Bone and Meat	----	----	2000	500	1000	700	----
Tankage	600	650	----	----	----	----	----
Bone	----	150	500	600	----	300	1200
Dissolved Bone Black	700	800	2000	600	600	700	----
Double Sulphate of potash and magnesia	650	100	500	----	----	----	----
Muriate of Potash	----	200	500	200	200	100	500
	2000	2000	6000	2000	2000	2000	1900

The cost given in each case represents the regular retail price of the raw materials delivered at the purchasers' freight station with the addition of $2.00 per ton to cover the cost of mixing. The average cost of these seven home-mixtures including cost of mixing is $36.76 and the average valuation $31.70 per ton. The percentage difference between cost and valuation is 16.0. In factory-mixed fertilizers this percentage difference has been on the average 41.3 for nitrogenous superphosphates and 33.2 for special manures during the last season.

The average valuation of these home-mixtures is therefore very much nearer their cost price than is the case with factory-mixed goods.

Most of the materials for these home-mixtures were bought at prices considerably below the regular retail rates, but for this comparison regular retail rates are employed.

Miscellaneous Fertilizers and Manures.

Cotton Hull Ashes.

In the table, page 62, are given analyses of 14 samples of Cotton Hull Ashes which show the usual variations of composition.

Analyses of Home Mixtures.

Station No.	Name or Brand	Made by	Sampled by	Cost per ton.	Valuation per Ton.	Percentage Diff.	Nitrogen.				Phosphoric Acid.					Potash.
							Nitric Nitrogen.	Ammonic Nitrogen.	Organic Nitrogen.	Total.	Water-soluble.	Citrate-soluble. (Reverted).	Insoluble.	Total.	Available.	
4328	For Potatoes.	E. E. Burwell, New Haven	E. E. Burwell.	$33.36	$25.81	29.2	....	.45	1.43	1.88	4.77	5.36	.68	10.81	10.13	7.14
4329	For Top-dressing Grass and Grain.	E. E. Burwell, New Haven.	E. E. Burwell.	34.52	28.67	20.5	.61	....	2.01	2.62	5.97	5.98	1.35	13.30	11.95	5.75
4330	For General Use.	N. D. Platt, Milford.	Station agent.	38.69	31.07	24.5	.71	trace	2.75	3.46	6.93	2.72	.38	10.03	9.65	7.85
4331	For Potatoes.	Dennis Fenn, Milford.	" "	38.55	33.97	13.5	1.62	....	2.56	4.18	6.08	6.62	1.50	14.20	12.70	5.13
4332	For Potatoes.	Dennis Fenn, Milford.	" "	37.40	32.81	14.0	1.44	....	3.17	4.61	5.81	4.40	.66	10.87	10.21	5.37
4333	For Potatoes.	Geo. F. Platt, Milford.	" "	36.25	32.83	10.4	1.74	....	2.87	4.61	6.61	5.61	1.31	13.53	12.22	2.82
4334	For General Use.	R. H. Tucker, Saybrook.	" "	38.55	36.73	4.9	.87	....	3.24	4.11	none	8.34	5.25	13.59	8.34	12.17

Sample **4202,** represented stock bought by Hermann Ude for $48.00 per ton. As the analysis showed the goods to be of very inferior quality, the seller agreed to take the Station valuation as the price.

Two samples were received at the Station from E. F. Brown, Berlin, who stated that they were from stock of J. C. Lincoln, Berlin, bearing tags marked "High Grade Sulphate of Potash, 90 to 95 per cent. sulphate potash."

These samples contained 22.09 and 24.98 per cent. of potash respectively, and were to all appearance cotton hull ashes.

A sample of Cotton Hull Ashes **4447,** sent by Olin Wheeler, Buckland, from stock bought of Olds & Whipple, Hartford, contained only 9.54 per cent. of potash, and 4.57 per cent. of phosphoric acid.

Messrs. Olds & Whipple being informed of the character of the goods took them back at once, and stated that the car lot would not be handled by them unless at a price corresponding to the valuation.

The price of "actual potash" in cotton hull ashes has ranged from 5.4 cents to 15.5 cents per pound, the average being 8.3 cents.

Formerly these ashes were one of the cheapest sources of available potash; they are now the most expensive source in market.

Analyses of Cotton Hull Ashes.

Station No.	Dealer or Purchaser.	Sampled by	Soluble Phosphoric Acid.	"Reverted" Phosphoric Acid.	Insoluble Phosphoric Acid.	Potash Soluble in Water.	Cost per ton.	Valuation per ton.	Potash costs per pound in cents.
4163	G. A. Douglass, Thompsonville	C. D. Woodworth, Thompsonville	.86	7.39	.67	25.80	$37.50	$35.23	5.4
4205	Olds & Whipple, Hartford	Griswold Bros. Tariffville	2.24	10 26	.22	27.94	45.00	43.41	5.5
4302	T. Soule & Co., New Milford	Station Agent	1.46	5.08	.34	28.36	40.00	37.26	5.7
4167	Olds & Whipple, Hartford	Station Agent	2.24	7.00	1.40	24.25	40.00	35.40	6.0
4304	Olds & Whipple, Hartford	Station Agent	2.24	6.40	.65	26.16	45.00	37.46	6.7
4320	W. S. Pinney, Suffield	Samuel Barr, Suffield	1.36	6.37	.68	25.26	45.00	35.43	7.1
4290	R. A. Parker, Warehouse Point	J. B. Noble, East Windsor Hill	.56	7.62	1.25	20.54	42.00	31.12	7.9
4206	Olds & Whipple, Hartford	Station Agent	trace	5.53	.27	18.54	40 00	25.68	9.1
4201	Edward Austin, Suffield	Arthur Sikes, Suffield	.59	7.17	.38	20.66	48.00	30.44	9.5
4291	I. Luther Spencer, Suffield	F. C. Root, West Suffield	.21	6.80	1.13	21.32	40.00	30.57	11.9
4357	Edward Austin & H. A. Sheldon	F. C. Root, West Suffield	trace	4.72	1.37	12.25	38.00	18.60	13.2
4356	Edward Austin	F. C. Root, West Suffield	trace	3.56	1.28	10.78	38.00	15.75	15.5
4202	I. Luther Spencer, Suffield	F. C. Root, West Suffield	none	8.77	1.37	13.38		24.25	
4148	J. H. Hale, So. Glastonbury	J. H. Hale, So. Glastonbury	.64	4.53	1.37	25.11		34.44	

Unleached Wood Ashes.

Station No.	Source.	Sampled and sent by	Potash Soluble in Water.	Phosphoric Acid.	Cost per ton in Car lots.
4166	Allison, Stroup & Co., New York City	J. E. Bishop, Clintonville	4.04	1.50	$11.50
4457	Allison, Stroup & Co., New York City	A. E. Atwater, Cheshire	4.70	1.28	10.50
4437	Allison, Stroup & Frost, New York City	L. S. Ellsworth, Simsbury	5.51	1.32	11.00
4186	Monroe, Lalor & Co., Oswego, N. Y.	Station Agent, from lot bought by J. F. Elwood, Greens Farms	6.20	1.34	11.50
4303	Monroe, Lalor & Co., Oswego, N. Y.	Station Agent, from lot bought by J. F. Holmes, Ridgefield	3.74	1.50	13.00
4322	F. R. Lalor, Dunnville, Ont., Canada	H. C. C. Miles, Milford	2.87	1.05	16.00*
4161	Bought in Canada	T. A. Stanley, New Britain	4.41	1.44	11.00
4450	H. K. Brainard, Thompsonville	Sumner F. Sikes, Suffield	5.43	1.50	12.00
4157	"Witch Hazel Extract Factory"	S. A. Smith, Clintonville	5.69	3.97	

* Retail, bagged.

Unleached Wood Ashes.

In the preceding table are given nine analyses of what purport to be unleached wood ashes.

The quantity of potash in **4322** is so small as to create suspicion that the ashes have been partially leached.

The high per cent. of phosphoric acid in **4157** is probably due to the fact that the ashes came from small twigs which contain considerably more phosphoric acid than older wood.

Lime Kiln Ashes.

A sample of this material, **4121,** sent by W. G. Atkins, Forestville, was partially analyzed with the following results :

Moisture	2.81
Sand and Soil	7.74
Lime	50.87
Phosphoric Acid	.53
Potash soluble in water	1.11
Total potash	2.02

This material contains about one per cent. of soluble potash.

As a fertilizer it ranks between ordinary unleached and leached ashes.

Saltpeter Waste.

Two samples of this waste, from the works of the Hazard Powder Co., Hazardville, were sent to the Station by T. J. Stroud, Shaker Station. The analyses are as follows :

	4071	**4159**
Nitrogen in Nitrates		6.39
Nitrogen, organic		.22
Total Nitrogen	5.07	6.61
Potash, as Nitrate and Sulphate		25.55
Potash as muriate		1.96
Total Potash	38.70	27.51
Chlorine		1.47

This is a waste from the purification of saltpeter or nitrate of potash, used in the manufacture of gunpowder, and as the analysis shows has very considerable value as a fertilizer, though its composition is variable.

Sheep Manure.

4442. This sample, sent by E. C. Ayer of Unionville, is stated to represent material dug from an abandoned sheep corral in the Southwest, disused because of the accumulation of dung.

Analysis.

Moisture	15.11
Nitrogen	1.37
Sand and Soil	48.29
Phosphoric Acid	1.60
Potash	1.87

This sheep manure has some value as a fertilizer, but would not pay for much transportation because nearly half its weight is due to sand.

Waste Material from the Enameling of Iron.

A sample of this material sent by Edwin Hoyt of New Canaan, with an inquiry as to its value, if any, was found to contain no nitrogen or phosphoric acid and only .26 per cent. of potash.

REVIEW OF THE FERTILIZER MARKET.

For the Year ending November 1st, 1894.

By E. H. Jenkins.

Nitrogen.

Nitric Nitrogen.

The *wholesale* New York quotations of nitrogen in nitrate of soda have fluctuated between 11.7 cents per pound in February and 14.4 cents in May, the average quotation for October, 1894, being 12.9 cents per pound.

The average wholesale quotation for the entire year has been 13.4 cents. The averages of the monthly quotations for the past few years have been as follows:

Year	1894.	1893.	1892.	1891.	1890.
Average quotation	13.0	12.7	12.1	12.9	11.5 cents.

The *retail* ton price of nitrogen in nitrate of soda in this State during the past season has been about 16 cents per pound.

Ammonic nitrogen.

The quotations of nitrogen in this form have ruled higher than ever before and are practically prohibitory on the use of sulphate of ammonia in profitable farming.

The *wholesale* New York price of nitrogen in this form has fluctuated between 16.4 cents and 18.5 cents per pound. The average of the monthly quotations for the past year has been 17.3 cents per pound.

The corresponding averages for 1893, 1892, 1891 and 1890, were 15.7 cents, 14.5, 15.6 and 16 cents respectively.

The *retail* cash price of nitrogen in this form within Conn. has been during the past season 19½ cents per pound.

Organic nitrogen.

The *wholesale* New York quotations for nitrogen in the form of high grade and low grade blood, azotin and tankage for each month in the year are shown in detail on page 71.

While in general not as high as in 1893 they have ruled higher than for some years previous to 1893. The nitrogen of red or high grade blood which was quoted during November 1893 at 16.6 cents per pound fell gradually to 12.6 cents per pound in

July, but has rallied sharply since. The average quotation for October was 15.1 cents per pound. Azotin and low grade blood have followed much the same course.

Dried blood, azotin and concentrated tankage scarcely appear in our retail market and accordingly retail figures cannot be given. Bone and a low grade tankage are much used by farmers as a source of nitrogen. Tobacco growers alone seem to be alive to the fact that the nitrogen of cotton seed meal is a readily available and comparatively a very cheap form of organic nitrogen.

If available to the tobacco plant it must certainly be so to any of our farm crops.

The nitrogen of cotton seed meal has cost at retail in Conn. the past season, as is shown on page 22 from 13.8 to 15.7 cents per pound. In castor pomace it has cost from 19.1 to 20.2 cents.

Phosphatic materials.

Rough bone has been uniformly quoted through the year at $19.50 per ton and bone black at the same price till within the last three months when the latter has fallen to $18.25 per ton.

Ground bone has advanced from $22.25 early in the year to $22.75 and bone meal has remained steady at $23.75.

Ground Charleston rock quoted at $8.37½ in Nov. 1893, rose to $8.50 in February but fell in August to $8.31½, and to 8.12½ in September and October.

Sulphuric acid was quoted a little lower in Oct. 1894 than earlier in the year.

Acid phosphate, was quoted at 61¼ cents per unit till April, when it fell to 59½ and 60 cents, but in August rose again and in October was quoted at 62½ cents. At this figure its available phosphoric acid costs 3.12 cents per pound *at wholesale.*

The retail price in Conn. of available phosphoric acid in dissolved bone black has been from 7.4 to 8.2 cents per pound. Acid phosphate rock, though much cheaper is not in our retail market. See pages 25 and 26.

Potash.

Muriate of Potash.

The *wholesale* New York price of potash in this form which was 3.74 cents per pound in November, 1893, fell slightly till April when it rose to 3.84 and in May to 4.13 at which price, the highest in years, it has remained up to November, 1894.

It has been generally retailed in Conn. for about 4.1 to 4.3 cents per pound during the last season.

The Double Sulphate of Potash and Magnesia.

The *wholesale* New York price of potash in this form which was 4.33 cents per pound in November, 1893, rose to 5.04 cents per pound in May, which price, the highest in years, has held up to the date of this writing Nov. 1894.

Potash in this form has retailed in Conn. for 5.5 cents.

High Grade Sulphate of Potash.

The *wholesale* New York price of potash in this form which was 4.15 cents per pound in Nov. 1893 rose in May to 4.85 cents, at which price, the highest in years, it has since been quoted.

It has been sold at retail in Conn. for 5.6 cents per pound, the last season.

Kainit.

This article, which was quoted at $9.12\frac{1}{2}$ per ton in November, 1893, rose in price with other potassium salts and was quoted in July 1894, at $11.00 and this price rules at this writing, Nov. 1894.

The market quotations given above are taken from the "Oil, Paint and Drug Reporter," published in New York. The weekly quotations for each month are averaged, and this average is taken as the quotation for the month.

The following explanations will help in the examination of the market quotations, and will also show the basis on which they have been interpreted in this review:

Phosphate rock, *kainit*, *bone*, *fish-scrap*, *tankage* and some other articles are quoted and sold by the ton. The seller usually has an analysis of his stock and purchasers often control this by analysis at the time of purchase.

Sulphate of ammonia, *nitrate of soda and muriate of potash* are quoted and sold by the pound, and generally their wholesale and retail rates do not differ very widely.

Blood, *azotin and ammonite* are quoted at so much "per unit of ammonia." To reduce ammonia to nitrogen, multiply the per cent. of ammonia by the decimal .824 (or multiply the percentage of ammonia by 14 and divide that product by 17). A "unit of ammonia" is one per cent., or 20 pounds per ton. To illustrate: if a lot of tankage has 7.0 per cent. of nitrogen, equivalent to 8.5 per cent. of ammonia, it is said to contain $8\frac{1}{2}$ units of ammonia,

and if quoted at $2.25 per unit, a ton of it will cost $8\frac{1}{2} \times 2.25 =$ $19.13.

The term "ammonia" is *properly* used only in those cases where the nitrogen actually exists in the form of ammonia, but it is a usage of the trade to reckon all nitrogen, in whatever form it occurs, as ammonia.

To facilitate finding the actual cost of nitrogen per pound from the cost per unit of ammonia in the market reports, the following table is given :

Ammonia at	$3.00	per	unit	is equivalent to	nitrogen at	18.2	cts. per lb.
"	2.90	"	"	"	17.6	"	
"	2.80	"	"	"	17.0	"	
"	2.70	"	"	"	16.4	"	
"	2.60	"	"	"	15.8	"	
"	2.50	"	"	"	15.2	"	
"	2.40	"	"	"	14.6	"	
"	2.30	"	"	"	14.0	"	
"	2.20	"	"	"	13.4	"	
"	2.10	"	"	"	12.8	"	
"	2.00	"	"	"	12.2	"	
"	1.90	"	"	"	11.6	"	
"	1.80	"	"	"	11.0	"	

Commercial sulphate of ammonia contains on an average 20.5 per cent. of nitrogen, though it varies considerably in quality. With that per cent. of nitrogen (equivalent to 24.3 per cent. of ammonia),

At	4.00	cents	per pound.	Nitrogen costs	19.5	cents	per lb.
"	3.95	"	"	"	19.3	"	
"	3.90	"	"	"	19.0	"	
"	3.85	"	"	"	18.8	"	
"	3.80	"	"	"	18.5	"	
"	3.75	"	"	"	18.3	"	
"	3.70	"	"	"	18.0	"	
"	3.65	"	"	"	17.8	"	
"	3.60	"	"	"	17.5	"	
"	3.55	"	"	"	17.3	"	
"	3.50	"	"	"	17.1	"	
"	3.45	"	"	"	16.8	"	
"	3.40	"	"	"	16.6	"	

Commercial Nitrate of Soda averages 95 per cent. of pure sodium nitrate or 16.0 per cent. of nitrogen.

If quoted at	3.0	cents	per pound,	Nitrogen costs	18.8	cents	per lb.
"	2.9	"	"		18.2	"	
"	2.8	"	"		17.5	"	
	2.7	"	"		16.9	"	

If quoted at	2.6	cents per pound,	Nitrogen costs	16.2	cents per lb.
"	2.5	"	"	15.6	"
"	2.4	"	"	15.0	"
"	2.3	"	"	14.4	"
"	2.2	"	"	13.8	"
"	2.1	"	"	13.2	"
"	2.0	"	"	12.5	"
"	1.9	"	"	11.9	"
"	1.8	"	"	11.3	"
"	1.7	"	"	10.6	"

Commercial Muriate of Potash and also High Grade (98 per cent.) Sulphate of Potash usually contain 50½ per cent. of "actual potash," or potassium oxide.

If quoted at	2.60	cents per lb.	Potassium Oxide costs	5.15	cents per lb.
"	2.50	"	"	4.95	"
"	2.40	"	"	4.75	"
"	2.30	"	"	4.55	"
"	2.25	"	"	4 45	"
"	2.20	"	"	4.35	"
"	2.15	"	"	4.25	"
"	2.10	"	"	4.15	"
"	2.05	"	"	4.06	"
"	2.00	"	"	3.96	"
"	1.95	"	"	3.86	"
"	1.90	"	"	3.76	"
"	1.85	"	"	3.66	"
"	1.80	"	"	3.56	"
"	1.75	"	"	3.46	"
"	1.70	"	"	3.36	"

The Double Sulphate of Potash and Magnesia has about 26½ per cent. of potassium oxide.

If quoted at	1.00	cents per lb.	Potassium Oxide costs	3.77	cents per lb.
"	1.05	"	"	3.96	"
"	1.10	"	"	4.15	"
"	1.15	"	"	4.34	"
"	1.20	"	"	4.53	"
"	1.25	"	"	4.72	"
"	1.30	"	"	4.90	"

The following table shows the fluctuations in the wholesale prices of a number of fertilizing materials in the New York market, since January, 1891. The price given for each month is the average of the four weekly quotations of that month. Sulphate of ammonia is assumed to contain 20.5 per cent. and nitrate of soda 16.0 per cent. nitrogen and muriate of potash 50½ per cent. of actual potash or 80 per cent. of pure salt.

Wholesale Prices of Fertilizing Materials.

		Cost of Nitrogen at wholesale in						Cost of Potash at wholesale in			
		Dried Blood.									
		Red. Cents per pound.	Black or low grade. Cents per pound.	Azotin or Ammonite. Cents per pound.	Concentrated Tankage. Cents per pound.	Nitrate of Soda. Cents per pound.	Sulphate of Ammonia. Cents per pound.	Muriate of Potash. Cents per pound.	Double Manure Salt. Cents per pound.	High Grade Sulphate of Potash. Cents per pound.	Available Phosphoric Acid in Dissolved South Carolina Rock. Cents per pound.
1891.	January	11.0	10.5	11.5	....	10.9	16.5	3.58	4.53	4.33	3.69
	February	12.0	11.0	11.5	....	12.5	16.5	3.58	4.53	4.33	3.69
	March	12.5	11.9	11.5	....	14.3	16.5	3.68	4.53	4.33	3.69
	April	12.4	12.0	11.5	....	14.4	16.5	3.68	4.53	4.33	3.69
	May	12.3	11.7	11.5	....	13.6	16.0	3 68	4.53	4.33	3.69
	June	12.3	11.7	11.5	....	13.2	15.5	3.68	4.53	4.33	3.69
	July	12.2	11.6	11.5	....	12.2	15 4	3.68	4.53	4.33	3.69
	August	12.3	11.8	11.5	....	11.3	15.4	3.68	4.53	4.33	3.69
	September	12.3	12.0	11.5	....	12.2	14.8	3.68	4 53	4.33	3.69
	October	12.3	12.0	11.5	....	13.6	14.7	3.68	4.53	4.33	3.69
	November	12.6	12.3	11.5	....	13.5	14.7	3.68	4.53	4.33	3.69
	December	12.4	12.1	11.5	....	13.3	14.7	3.63	4.63	4.41	3.69
1892.	January	12.2	11.5	11.5	....	12.9	14.7	3.62	4.79	4.45	3.69
	February	11.6	11.3	11.5	....	12.0	14.7	3.64	4.77	4.48	3.69
	March	11.5	11.0	11.2	....	12.1	14.7	3.71	4.77	4.48	3.69
	April	11.8	11.3	11 2	....	11.0	14.7	3.78	4.77	4.48	3.69
	May	12.0	11.5	11.2	....	10.5	14.7	3.78	4.77	4.48	3.69
	June	11.7	11.2	11.2	....	10.6	14 7	3.78	4.77	4.48	3.69
	July	12.1	11.7	11.2	....	11.1	14.7	3.78	4.77	4.48	3.69
	August	12.3	12.1	11.2	....	11.7	14.7	3.78	4.77	4.48	3.60
	September	12.4	12.0	12.0	....	12.4	14.2	3.78	4.77	4.48	3.30
	October	13.0	12.6	12.6	....	12.9	14.0	3.78	4.77	4 48	3.30
	November	14.1	13.8	13.7	....	13.7	14.0	3.78	4.77	4.48	3.30
	December	14.6	14.2	14.8	....	13.7	14.0	3.78	4.77	4.48	3.30
1893.	January	16.2	15.8	15.9	12.3	13.8	14.0	3.51	4.25	4.70	3.33
	February	18.5	18.0	17.9	15.7	14.1	14.0	3.56	4.32	4.16	3.09
	March	20.0	19.8	19.6	19.3	14.7	15.6	3.56	4.32	4.16	3.09
	April	18.0	17.7	18.1	19.3	14.6	17.1	3.56	4.32	4.16	3.09
	May	16.2	15 4	16.4	18.3	13.0	17.1	3.56	4.32	4.16	3.09
	June	14.5	14.0	14.8	14.2	11.0	15.9	3.75	4.32	4.16	3.09
	July	13.7	13.1	13.7	14.2	11.1	14.9	3.75	4.32	4.16	3.09
	August	13.5	12.1	13.9	14.2	11.4	15.6	3.75	4.25	4.16	3.09
	September	12.5	12.2	13.2	14.2	11.6	15.9	3.75	4.32	4.16	3.09
	October	16.2	15.3	15.3	17.1	11.9	16.4	3 75	4.32	4.16	3.09
	November	16.6	15.7	16.6	16.3	11.7	16.4	3.74	4.33	4.15	3.09
	December	16.1	15.3	16.1	16.3	11.3	16 4	3.74	4.33	4.15	3.09
1894.	January	15.9	14.7	16.0	15.9	12.0	16.7	3.58	4.30	4.18	3.09
	February	15.9	15.2	15.9	15.4	11.7	15.4	3.71	4.44	4.28	3.09
	March	15.5	14.6	15.5	15.4	13.0	18.5	3.71	4.44	4.28	3.09
	April	14.5	13.9	14.2	13.3	14.0	17.6	3.84	4.54	4.39	2.98
	May	14.5	13.8	14.2	12.2	14.4	16.7	4.13	5.04	4.85	3.00
	June	13.2	12.6	13.1	12.2	14.3	16.7	4.13	5.04	4.85	3.00
	July	12.6	12.6	12.9	12.2	13.8	16.8	4.13	5.04	4.85	3.00
	August	13.3	12.6	13.3	12.3	13.7	17.7	4.13	5.04	4.85	3.09
	September	15.7	14.5	15.4	12.3	13.5	18.2	4.13	5.04	4.85	3.12
	October	15.1	14.4	15.2	12.4	12.9	17.5	4.13	5.04	4.85	3.12

THE QUANTITY OF COMMERCIAL FERTILIZERS ANNUALLY SOLD IN CONNECTICUT.

In November last a letter was sent to each manufacturer whose goods were entered for sale in this State asking for a statement of his total sales during the year ending Nov. 1, 1894, and stating that the replies would be held as strictly confidential. More than two-thirds of the manufacturers furnished the facts asked for.

The sales reported and a conservative estimate of the sales of those who did not report make it clear that the total amount of commercial fertilizers sold within the State annually cannot be less than 22,500 tons. If thirty dollars per ton is an average price, the total annual outlay for commercial fertilizers in this State is $675,000.

A similar estimate made in 1887 gave a total of 16,700 tons, costing $500,000. (Report for 1887, p. 182.)

This statement covers only factory-mixed goods, bone, mixtures of bone and salts, and fertilizer chemicals, all of which are handled by manufacturers of mixed goods. It does not, however, by any means show the total quantity of fertilizers used in the State.

It does not, for instance, include unleached wood ashes, a favorite fertilizer with fruit growers, cotton hull ashes or tobacco stems, and only a small part of the cotton seed meal which is used in the tobacco growing region in very large amount. It is impossible to estimate how much of the materials above named are annually bought.

ON METHODS TO DETERMINE THE AVAILABILITY OF ORGANIC NITROGEN IN FERTILIZERS.

By S. W. Johnson and E. H. Jenkins.

(Summaries of results and the conclusions drawn from them will be found on pages *88*, *90*, *93*, *96*, *102*, *103*, *107*, *111*.)

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The work described in this paper is a continuation of what has been done by this Station on the same subject in former years of which account has been given in the following articles:—On Methods of Testing the Agricultural Value of Nitrogen in Mixed Fertilizers, Report of this Station, for 1885, pp. 115–132; On the Agricultural Value of Horn Dust and of Horn and Hoof, Report for 1886, pp. 80–89; Methods to Determine the Availability of Organic Nitrogen in Fertilizers, Report for 1893, pp. 218–237.

The work of the present year has chiefly consisted of vegetation experiments carried on in pots, following in the main the method which has been so admirably perfected by Prof. Wagner of Darmstadt.

Further tests have also been made of the solubility of various organic forms of nitrogen in pepsin-hydrochloric acid and under putrefaction; and their results are compared with the results on the relative availability of the nitrogen as shown by vegetation experiments.

I. VEGETATION EXPERIMENTS.

Mr. W. E. Britton, Horticulturist to this Station, has had entire charge of the preparation of the seed and the artificial soil, filling the pots and caring for the crops through the whole period of growth and the success of the work is largely due to his patience and skill.

The chemical work involved has been done by the Station chemists, Messrs. Winton and Ogden.

General Scope of the Experiments of 1894.

1. Study has been made of the requirements of the maize plant with special reference to the proper supply of plant food and water when grown in pots under the conditions of our work.

2. The following materials have been compared in respect to the availability of their nitrogen, viz: nitrate of soda, dried blood, fish scrap, tankage, ground horn and hoof, cotton-seed meal, linseed meal, castor pomace, leather raw, roasted, steamed and acidified with oil of vitriol.

3. It was also sought to test the availability of organic nitrogen in twenty-seven brands of commercial fertilizers, found in the Connecticut market.

Description of the Apparatus and Method.

In some cases two, in others four, pots were used to test each form of nitrogenous matter.

These pots were filled with an artificial soil to which were added all the elements of plant food in excess of the crop requirements, excepting nitrogen.

The nitrogenous matter was added in such quantity as to supply either 0.8, 1.6, 2.4 or 3.2 grams of nitrogen.

The availability of the nitrogen was determined by the weight of the water-free crop produced and by the quantity of nitrogen taken up by the crop.

The "crop" does not include the roots as it is impossible to separate them satisfactorily from the artificial soil.

The crops, of course, can be used as a measure of availability of nitrogen only when it is certain that the nitrogen of the fertilizer is deficient relatively to the other elements of plant food.

As we have found the apparatus and materials used to be well adapted to the purpose and as we plan to do further work with the same, a full description of them is here given.

The Vegetation House.—This house, 27 feet long by 19 feet wide and 15 feet from sills to peak, was built essentially as respects constructive details after the model designed by Prof. L. H. Bailey of the Cornell Experiment Station which is figured and described in American Gardening for February, 1893, p. 95.

Considerable modifications have been made, however, to suit the structure to its special uses. As it is designed only for summer use, no heating apparatus is provided, but ample means for ventilation have been secured. Besides a glazed door at each end, eight feet by three feet seven inches, and glazed ventilators at both sides of the ridge running the whole length of the house, which are two feet wide and are opened and closed readily by an apparatus made by Hitchings & Co., of New York, there are between the glass and the sills, four wooden ventilators on each side of the house, two of them two feet two wide by seven feet two long, and two others, two feet two by four feet eight inches. On each end are also two wooden ventilators two feet two by three feet six inches. All these ventilators are hung by hinges on the upper edges and open outwards.

Fine wire netting is fastened over all the ventilating openings within to exclude insects without interfering with the movement of the ventilators. Protection from grasshoppers and crickets is especially necessary. Wire netting doors make it possible also to leave the sash doors open for ventilation when desired. The construction is nearly as slight as is consistent with safety and offers very little obstruction to sunlight.

The ridge of the house and the three benches on which the pots stand run nearly north and south.

Observations were made through the season at 9 A. M., 12 M. and 5 P. M. to determine how much the temperature in the shade

within the house differed from the air temperature in the shade without.

At the times of ten single observations the temperature within the house was lower than without, but at all other times of observation the reverse was the case.

The greatest observed difference of temperature was ten degrees Fahr.

The greatest difference between the mean of the three daily observations without and within the house was 7.3 degrees Fahr.

The average daily difference was 3.6 degrees Fahr.

Water Supply.—In one corner of this vegetation house was placed a circular tank 23 inches in diameter and 39 inches deep made of heavy "galvanized" iron and painted inside with asphalt. A battery of Pasteur-Chamberland filters, attached to the city water service pipes supplied very pure water which was stored in this tank for use in the experiment.

The general appearance and arrangement of the house are shown in the accompanying plates.

Plate I shows the appearance of the house seen from the southwest. The ventilators at the sides and in the peak and the sash doors in the ends, are all opened, the netting doors being closed. It was not found necessary to use the ventilators in the ends of the building during the season.

The iron pipes which support the sash bars and give rigidity to the structure are seen within. The arrangement of these supports is described in Prof. Bailey's paper already referred to.

Plate II shows the interior plan. A and B are the north and south end doors. C, D and E, are the three benches which carry the vegetation pots. Table C is 21 feet long by $3\frac{3}{4}$ feet wide, table D $19\frac{1}{3}$ feet long by 3 feet 2 inches wide, and table E is 23 feet long by $3\frac{3}{4}$ feet wide. The tops of these benches are 16 inches above the level of the top of the sills and 15 inches below the level of the glass in the sides of the building. F is the water tank and H a faucet from which with rubber hose water may be drawn for watering the floor and tables when desired.

Pots.—The pots used were made of "galvanized" iron, wired on the upper edge. They were eight inches in diameter, twelve inches deep, the bottom slightly concave, and in the center of the bottom was a hole with a collar $\frac{3}{4}$ of an inch in diameter, which could be closed with a rubber stopper. Each pot was supported on three iron legs, so that the lowest point of the collar

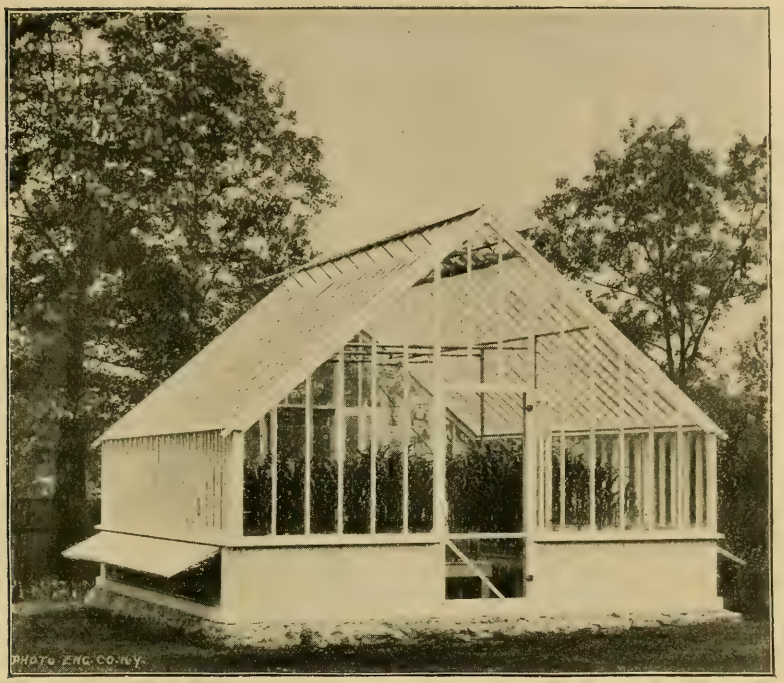


PLATE I. Vegetation House.

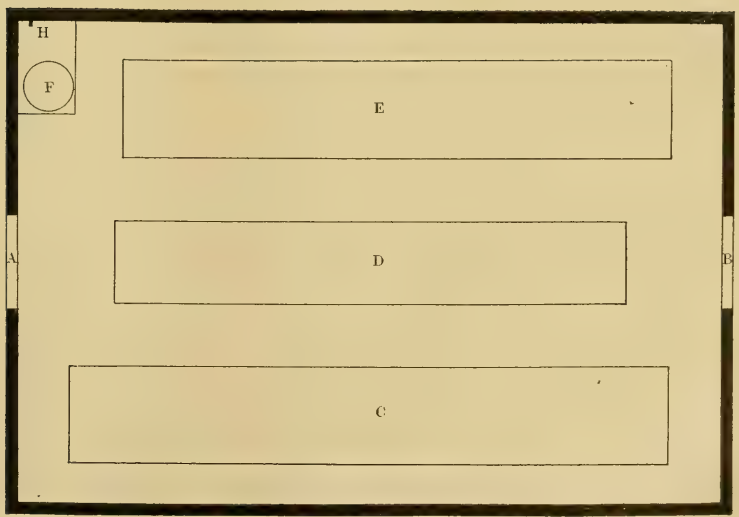


PLATE II. Interior Plan of Vegetation House.

referred to was two and a half inches above the platform on which the pot stood. The general appearance of the pots may be seen by reference to the plates facing page 104.

The Artificial Soil consisted of sifted anthracite coal ashes, to which three per cent. of peat moss had been added. This peat moss, we are informed is imported for stable bedding. It was sifted, and only that part was used which passed a sieve with about six meshes to the inch. This peat has a slight acid reaction and on digestion with water continued to give up acid for 48 hours. The total quantity thus extracted per gram of peat moss, neutralizes about .1144 grams of barium hydrate. Distilled with magnesia, four grams yielded a bare trace of ammonia. The peat moss contains $\frac{64}{100}$ of one per cent. of nitrogen. The coal ashes, fresh from the Station steam heater, were sifted through a wire sieve having square meshes, four to the inch. The ashes were perfectly neutral in reaction, and contained $\frac{6}{100}$ of one per cent. of nitrogen.

For the experiments of 1893, described in the Report for that year, p. 230, a mixture of five p. c. peat moss and 95 p. c. coal ashes was used as soil. Observations then made indicated that a smaller proportion of peat would give physical conditions quite as favorable to vegetation and led us to reduce the quantity this year to three per cent.

Fertilizer Ingredients.

Besides nitrogen, which was supplied in different forms and varying quantities, there was added to the soil of every pot a definite quantity of calcium carbonate, potassium sulphate, dicalcium phosphate and "concentrated phosphate."

The complete analyses of these materials follow:

TABLE I. ANALYSES OF FERTILIZERS USED IN THE EXPERIMENTS.

	Calcium Carbonate.	Potassium Sulphate.	Dicalcium Phosphate.	"Concentrated" Phosphate.
Sand and Silica	- - -	.36	----	6.26
Oxide of iron and alumina	----	.70	----	38.37
Lime (CaO)	53.18	.55	35.49	.30
Magnesia	.90	2.88	----	.12
Potash (K_2O)	----	46.30	----	----
Soda	----	.59	----	.42
Phosphoric Acid (P_2O_5)	----	----	42.36	45.61
Sulphuric Acid (SO_3)	----	43.34	----	.21
Chlorine	----	1.80	----	trace
Carbonic Acid (CO_2)	43.82	----	----	----
Water	2.10	3.44	22.15	8.85
	100.00	99.96	100.00	100.14

With the exception of Nos. 36 to 49, both inclusive, the soil of every pot received 15 grams of calcium carbonate, 4.4 grams of potassium sulphate, 1.5 grams of dicalcium phosphate and 1.2 grams of concentrated phosphate.

Hence, with the exceptions noted above, the soil of each pot received, in addition to what plant food the ashes themselves contained, the following quantities of mineral ingredients :

Potash (K_2O)	2.04	grams.
Soda	.03	"
Lime (CaO)	8 54	"
Magnesia (MgO)	.27	"
Oxide of iron and alumina	.49	"
Phosphoric Acid (P_2O_5)	1.18	"
Sulphuric Acid (SO_3)	1.91	"
Chlorine	.08	"

The object of adding calcium carbonate was to maintain in the soil the mild alkalinity essential to the process of nitrification.

Seed.—The seed maize used was Hickox Improved Sweet Corn, raised in Milford, Conn. about nine miles from the Station.

By means of concentrated sugar solutions at a temperature of 24°C. there were separated those kernels which had an apparent specific gravity between 1.246 and 1.216.

After these were thoroughly and rapidly washed and air dried the separate kernels were weighed, reserving for experiment only those which weighed between .290 and .320 gram each, this being about the medium weight.

This work was deemed necessary in order to secure plants of equal vigor and fairly comparable. Unfortunately the seed corn of 1893 was of poor quality and the plants were not altogether satisfactory.

Filling and planting Vegetation Pots.—After thorough washing and drying, each pot was fitted with a piece of wire gauze over the hole in the bottom and with a glass tube of about $\frac{1}{8}$ inch bore, reaching to the bottom of the pot and projecting about $\frac{1}{2}$ inch above its upper rim. Washed fine quartz gravel was poured in, till the weight of the pot and contents was exactly 2721 grams (6 pounds). The layer of gravel was from $\frac{1}{2}$ to $\frac{3}{4}$ inch deep in the shallowest part.

Into each pot were next poured 4536 grams (ten pounds) of the artificial soil which had been thoroughly intermixed by hand with

the fertilizers already referred to, and with the weighed amount of organic nitrogen designed for that pot, the whole charge being pressed down to the same level in all the pots.

To each pot was then added 1446 grams (3 pounds and 3 ounces) of water which represented about 40 per cent. of the water-holding capacity of the soil.

The maize seed after soaking twelve hours in water was placed in a germinating apparatus.

On the 15th and 16th of June as the maize sprouted, three healthy looking seedlings were placed in each pot on the surface of the soil and equidistant from each other.

They were covered with 340 grams (12 ounces) of the mixture of peat and ashes which buried the seeds about three-quarters of an inch deep.

To 150 grams of rich garden soil were added 1500 c.c. of water and the whole shaken together. After the sand, etc., had settled, 15 c.c. of the turbid, supernatant liquid were added to each of the pots excepting Nos. 28 to 35 both inclusive. It was intended in this way to make more certain of the presence of nitrifying organisms within the soil.

On June 19th nearly all the plants had come up and the pots were removed to the vegetation house.

Care of the Experiments during Growth.

By frequent weighing and watering the water content of the soil in all the pots, excepting Nos. 14 to 21, both inclusive, was kept between 30 and 50 per cent. of the water-holding capacity of the soil. In vegetation experiments with natural soils a much higher percentage is adopted, but because the water-holding capacity of this artificial soil is greater than that of ordinary natural soils the lower figure was thought to be adequate. The relative position of the pots was changed from time to time in order to equalize as far as possible their exposure to light and heat.

In spite of the care exercised in selecting seed it immediately appeared that a part of the seedlings were incapable of growth.

On June 26, one plant was missing in each of the following pots. Nos. 1, 13, 24, 66, 72, 81, 96, 103, 115, 129, 145, 149. Two plants were missing in pots 21 and 26. The decaying seeds were removed and new ones planted which in all cases lived.

On July 2, one plant in No. 127 appeared as if badly burned. One plant in pot 134 was badly diseased, made no growth and was removed.

Each of the following pots had one, more or less abnormal, stunted plant; Nos. 1, 7, 23, 36, 47, 51, 114, 126, 130 and 134. Some of these afterwards grew to good size but never equaled the others in the same pot. It was noted that where a single plant was feeble and small another in the same pot would grow to be correspondingly larger, as if it took to itself the nitrogen which the other did not appropriate.

On July 18th, it was thought that the pots were standing too close to permit full development of all the plants. The foliage of the plants in certain pots was becoming pale green as if light were deficient. Those pots which had the larger supply of nitrogen, Nos. 7, 8, 12, 13, 24, 25, 26, 27, 104, 105, 108, 109, 112, 113, 116, 117, 125, 126, 130, 141, were therefore removed to a green house used in last year's experiments.

July 23d, those plants which received the smallest quantities of nitrogen, within a few days became very appreciably lighter in color, as if this date marked the time when nitrogen-hunger, or more properly nitrogen-starvation had set in.

On July 20, 4.9535 grams of nitrate of soda, equivalent to .8 gram nitrogen were added to pots 11 and 13.

July 30, the first staminate flower appeared, in pot 30.

Aug. 1. The tips of leaves were brown and dry on many plants among those which had received least nitrogen.

Aug. 2. By accident one plant in pot 116 was broken off close to the ground.

Aug. 11. Nearly all the plants which received the smallest quantity of nitrogen had very light green foliage, in sharp contrast with the others and were evidently suffering for lack of nitrogen. There were staminate flowers on two-thirds of the plants.

Aug. 13. Pistillate flowers first appeared on the plants of pots 12 and 26.

Aug. 16. The following pots were sent to the laboratory for harvest and chemical examination of the crops: Nos. 3, 51, 53, 55, 57, 59, 62, 64, 66, 68, 70, 72, 74, 76, 79, 81, 83, 85, 87, 89, 93, 95, 97, 98, 100, 118, 119, 121, 135, 138, 142, 146.

Aug. 17. The pots which were removed on July 18th were brought back to the vegetation house.

Aug. 28. The following pots were sent to the laboratory for harvest and chemical examination of the crops: Nos. 50, 52, 54, 56, 58, 60, 63, 65, 67, 69, 71, 73, 75, 77, 78, 80, 82, 84, 86, 88, 91, 92.

Aug. 27 to 31, all the pistillate flowers were pollinated by hand daily.

Sept. 18. All the pots remaining in the vegetation house were sent to the laboratory for harvest and chemical examination of the crops.

None of these plants reached normal size or development because in all cases there was a deficiency of nitrogen or of other elements of plant food.

In each of thirty-eight of the crops there were one or more ears, in all cases small or abortive. The following statement gives the number of ears which contained kernels of corn.

The crops in the following pots each had one seed-bearing ear: 5, 6, 8, 12, 13, 15, 17, 23, 24, 33, 104, 106, 107, 117, 124, 128, 130, 148.

Each of the following carried two seed-bearing ears:—1, 7, 9, 10, 11, 19, 21, 25, 27, 29, 30, 105, 108, 109, 113, 126, 141.

The following had each three ears with seed:—26, 112, 125.

In pots 29 and 108 both ears were on one plant.

Determination of Dry Weight of Crops and of Nitrogen in them.

The crops were harvested as soon as they were brought to the laboratory. The three plants from each pot were cut off close to the surface of the soil; then cut into small pieces about half an inch long, and dried in a large drying oven at a temperature below 100° C. After drying, each crop was ground without any mechanical loss in a feed mill and allowed to stand exposed to the air for twenty-four hours. It was then weighed on a chemical balance, sensitive to a fraction of a milligram, and securely bottled.

Duplicate portions of the air-dry material (two grams in each), contained in weighing bottles were dried to constant weight at a temperature of 100° C.

From the result was calculated the weight of the water-free crop.

Nitrogen was also determined in duplicate portions.

In the following table, and preliminary to a discussion of the results of these vegetation experiments, are given all the data regarding the nitrogen supply and the quantities of water-free substance and of nitrogen harvested.

The following explanations are referred to by small numerals in their appropriate places in the table.

[1] The nitrogen was added August 6th. At that time the appearance of the crop was like that of crops in pots 2, 3, and 4.

[2] .8 gram nitrogen added at planting time and .8 on July 20.

[3] .8 gram nitrogen was added at planting, and .8 on July 20 and also on Aug. 6th.

[4] The water in the pot was kept between 80 and 60 per cent. of the water-holding capacity of the soil. See p. 87.

[5] The water in the pot was kept between 70 and 50 per cent. of the water-holding capacity of the soil. See p. 87.

[6] The water in the pot was kept between 60 and 40 per cent. of the water-holding capacity of the soil. See p. 87.

[7] The water in the pot was kept between 80 and 40 per cent. of the water-holding capacity of the soil. See p. 87.

[8] No soil extract was added to the soil.

[9] 100 grams of garden soil were added to the soil.

[10] Normal quantity phosphoric acid, $\frac{1}{2}$ normal quantity of potash.

[11] " " " " $\frac{3}{4}$ " " "

[12] " " " " $1\frac{1}{4}$ " " "

[13] " " " " $1\frac{1}{2}$ " " "

[14] " " potash, $\frac{1}{2}$ normal quantity phosphoric acid.

[15] " " " $\frac{3}{4}$ " " " "

[16] " " " $1\frac{1}{4}$ " " " "

[17] " " " 1.7 " " " "

[18] $1\frac{1}{2}$ normal quantity potash, 1.7 normal quantity of phosphoric acid.

[19] $1\frac{1}{4}$ " " " and " " " "

[20] $1\frac{1}{2}$ " " " and " " " "

[21] Normal quantity potash, $1\frac{1}{4}$ " " " "

[22] " " " 1.7 " " " "

[23] $1\frac{1}{2}$ normal quantity potash, 1.7 " " " "

The data given in this table may now be discussed in detail.

The basis of comparison of the crops and of the nitrogen in them is the *increase of crop* and of assimilated nitrogen produced by the several fertilizers over what was produced on the artificial soil without any nitrogenous fertilizer (pots 2, 3, and 4). This for brevity is referred to in the following discussion as "Crop Increase," and "Nitrogen Increase."

TABLE II.—VEGETATION EXPERIMENTS OF 1894. DATA REGARDING FERTILIZERS AND CROPS HARVESTED.

No. of Pot.	Nitrogen supplied		The Crop.			The Nitrogen in the Crop.			
	In form of	Quantity of nitrogen supplied. (grams.)	Weight of air-dry Crop (exclusive of roots). (grams.)	Weight of water-free Crop. (grams.)	Increase of Crop over Crop of Pots 2, 3 and 4. (grams.)	Per cent. of nitrogen in the air-dry Crop.	Total nitrogen of Crop (exclusive of roots). (grams.)	Increase of nitrogen of Crop over that of Crop in Pots 2, 3 and 4.	Of 100 parts of nitrogen in the fertilizer there were recovered in the Crop. (parts.)
1	----------	.8 [1]	35.49	32.76	29.60	1.31	.465	.448	----
2	----------	none	3.54	3.23	------	.48	.017	-----	----
3	----------	none	2.90	2.60	------	.52	.015	-----	----
4	----------	none	3.91	3.64	------	.46	.018	-----	----
5	Ground Horn and Hoof	.8	82.97	74.01	70.85	.37	.307	.290	36.3
6	" " " "	1.6	130.42	118.92	115.76	.43	.561	.544	33.3
7	" " " "	2.4	140.90	128.89	125.73	.72	1.015	.998	41.6
8	" " " "	3.2	143.63	132.38	129.22	.89	1.278	1.261	39.4
9	Nitrate of Soda	.8	109.70	99.88	96.72	.35	.384	.367	45.9
10	" "	1.6	154.77	140.87	137.71	.56	.867	.850	53.2
11	" "	.8+.8 [2]	144.86	131.94	128.78	.55	.797	.780	48.8
12	" "	2.4	116.57	107.18	104.02	1.18	1.376	1.359	56.6
13	" "	.8+.8+.8 [3]	124.43	113.42	110.26	1.23	1.531	1.514	63.1
14	Dried Blood	.8 [4]	88.29	80.01	76.85	.37	.327	.310	38.8
15	" "	1.6 [4]	164 22	151.44	148.28	.38	.624	.607	38.0
16	" "	.8 [5]	104.89	96.66	93.50	.34	.357	.340	42.6
17	" "	1.6 [5]	160.95	145.03	141.97	.37	.596	.579	36.2
18	" "	.8 [6]	92.44	85.75	82.59	.37	.342	.325	40.7
19	" "	1.6 [6]	136 39	124.14	120.98	.44	.600	.583	36.5
20	" "	.8 [7]	100.57	91.95	88.79	.37	.372	.355	44.5
21	" "	1.6 [7]	142.35	131.68	128.52	.42	.598	.581	36.4
22	Dried Blood	.8	85.63	76.56	73.40	.39	.334	.317	39.7
23	" "	1.6	143.87	129.48	126.32	.42	.604	.587	36.7
24	" "	2.4	150.09	135.48	132.32	.62	.931	.914	38.1
25	" "	2.4	155.98	141.29	138.13	.65	1.030	1.013	42.2
26	" "	3.2	141.43	130.12	126.96	.91	1.287	1.270	40.2
27	" "	3.2	170.40	153.35	150.19	.74	1.261	1.244	38.7
28	Dried Blood	.8 [8]	87.47	79.71	76.55	.35	.306	.289	38.3
29	" "	1.6 [8]	147.28	136.81	123.65	.45	.663	.646	41.4
30	" "	2.4 [8]	150.52	138.58	135.42	.66	.993	.976	41.6
31	Dried Blood	.8 [9]	80.57	73.31	70.15	.44	.354	.337	44.3
32	" "	1.6 [9]	129.94	117.83	114.67	.42	.546	.529	34.1
33	" "	2.4 [9]	160.53	146.93	143.77	.65	1.043	1.026	43.5
34	" "	none [9]	6.25	5.70	2.54	.36	.023	.006	----
35	" "	none [9]	3.73	3.42	.26	.42	.016	-----	----
36	Dried Blood	1.6 [10]	131.48	120.45	117.29	.40	.526	.509	32.9
37	" "	1.6 [11]	128.73	118.64	115.48	.41	.528	.511	33.0
38	" "	1.6 [12]	123.43	112.83	109.67	.46	.568	.551	35.5
39	" "	1.6 [13]	140.21	127.69	124.53	.40	.561	.544	35.1

TABLE II.—VEGETATION EXPERIMENTS OF 1894. DATA REGARDING FERTILIZERS AND CROPS HARVESTED.—*Continued.*

No. of Pot.	Nitrogen supplied		The Crop.			The Nitrogen in the Crop.			
	In form of	Quantity of nitrogen supplied. (grams.)	Weight of air-dry Crop (exclusive of roots). (grams.)	Weight of water-free Crop. (grams.)	Increase of Crop over Crop of Pots 2, 3 and 4. (grams.)	Per cent. of nitrogen in the air-dry Crop.	Total nitrogen of Crop (exclusive of roots). (grams.)	Increase of nitrogen of Crop over that of Crop in Pots 2, 3 and 4.	Of 100 parts of nitrogen in the fertilizer there were recovered in the Crop. (parts.)
40	Dried Blood	1.6[14]	122.68	110.19	107.03	.42	.515	.498	32.2
41	" "	1.6[15]	139.75	128.93	125.77	.40	.559	.542	34.9
42	" "	1.6[16]	135.41	125.92	122.76	.43	.582	.565	36.4
43	" "	1.6[17]	143.75	132.54	129.38	.45	.647	.630	40.4
44	Dried Blood	1.6[18]	134.83	121.97	118.81	.41	.553	.536	34.6
45	" "	1.6[19]	91.84	82.68	79.52	.35	.321	.304	20.1
46	" "	1.6[20]	98.94	90.56	87.40	.32	.317	.300	19.4
47	Dried Blood	1.6[21]	82.80	75.74	72.58	.42	.348	.331	21.7
48	" "	1.6[22]	92.92	85.07	81.91	.35	.325	.308	20.3
49	" "	1.6[23]	97.87	89.85	86.69	.34	.333	.316	20.8
50	I Commercial Mixed Fertilizer	1.6	114.12	101.81	98.65	.37	.422	.405	26.4
51	II " " "	.8	55.32	50.59	47.43	.41	.227	.210	26.0
52	II " " "	1.6	121.42	107.99	104.83	.36	.437	.420	27.3
53	III " " "	.8	66.47	61.08	57.92	.39	.259	.242	32.4
54	III " " "	1.6	134.65	118.57	115.41	.39	.525	.508	32.8
55	IV " " "	.8	65.84	60.19	57.03	.40	.263	.246	32.9
56	IV " " "	1.6	114.88	101 99	98.83	.43	.494	.477	30.9
57	V " " "	.8	54.30	49.50	46.34	.41	.220	.203	27.5
58	V " " "	1.6	113.44	99.90	96.74	.38	.431	.414	27.0
59	VI " " "	.8	66.27	61.03	57.87	.39	.259	.242	32.4
60	VI " " "	1.6	126.55	111.17	108.01	.42	.531	.514	33.2
61	VII " " "	1.6	102.70	90.79	87.63	.39	.401	.384	25.0
62	VIII " " "	.8	54.63	49.64	46.48	.53	.290	.273	36.2
63	VIII " " "	1.6	130.54	112.03	108.87	.39	.509	.382	31.8
64	IX " " "	.8	69.46	63.69	60.53	.43	.295	.278	36.9
65	IX " " "	1.6	147.31	127.63	124.47	.38	.560	.543	35.0
66	X " " "	.8	65.65	60.71	57.55	.44	.289	.272	36.1
67	X " " "	1.6	146.91	129.84	126.68	.38	.558	.541	34.9
68	XI " " "	.8	50.23	45.84	42.68	.44	.221	.204	27.6
69	XI " " "	1.6	109.90	98.69	95.53	.38	.418	.401	26.1
70	XII " " "	.8	51.72	47.07	43.91	.42	.217	.200	27.1
71	XII " " "	1.6	107.80	93.25	90.09	.36	.388	.371	24.2
72	XIII " " "	.8	67.22	61.66	58.50	.41	.276	.259	34.5
73	XIII " " "	1.6	156 39	137.09	133.93	.39	.610	.593	38.1
74	XIV " " "	.8	59.04	54.37	51.21	.38	.224	.207	28.0
75	XIV " " "	1.6	118.88	103.23	100.07	.38	.452	.435	28.2
76	XV " " "	.8	65.22	59.03	55.87	.43	.280	.263	35.0
77	XV " " "	1.6	133.23	115.87	112.71	.40	.533	.516	33.3
78	XVI " " "	1.6	75.42	64.72	61.56	.38	.287	.270	18.0
79	XVII " " "	.8	82.89	75.62	72.46	.43	.356	.339	44.5
80	XVII " " "	1.6	145.49	128.76	125.60	.39	.568	.551	35.0
81	XVIII " " "	.8	40.96	37.61	34.45	.46	.188	.171	23.5
82	XVIII " " "	1.6	106.20	91.94	88.78	.37	.393	.376	24.6

TABLE II.—VEGETATION EXPERIMENTS OF 1894. DATA REGARDING FERTILIZERS AND CROPS HARVESTED.—*Continued.*

No. of Pot.	Nitrogen supplied		The Crop.			The Nitrogen in the Crop.			
	In form of	Quantity of nitrogen supplied. (grams.)	Weight of air-dry Crop (exclusive of roots). (grams.)	Weight of water-free Crop. (grams.)	Increase of Crop over Crop of Pots 2, 3 and 4. (grams.)	Per cent. of nitrogen in the air-dry Crop.	Total nitrogen of Crop (exclusive of roots). (grams.)	Increase of nitrogen of Crop over that of Crop in Pots 2, 3 and 4.	Of 100 parts of nitrogen in the fertilizer there were recovered in the crop. (parts.)
83	XIX Commercial Mix'd Fertilizer	.8	56.98	52.33	49.17	.44	.251	.234	31.4
84	XIX " " "	1.6	138.76	122.66	119.50	.41	.569	.552	35.6
85	XX " " "	.8	70.23	63.91	60.75	.39	.274	.257	34.2
86	XX " " "	1.6	127.50	110.51	107.35	.42	.536	.519	33.5
87	XXI " " "	.8	64.70	59.53	56.37	.44	.285	.268	35.6
88	XXI " " "	1.6	132.75	116.13	112.97	.39	.518	.501	32.4
89	XXII " " "	.8	71.09	64.45	61.29	.40	.284	.267	35.5
90	XXII " " "	1.6	141.80	125.29	122.13	.39	.553	.536	34.6
91	XXIII " " "	1.6	100 33	86.65	83.49	.37	.371	.354	23.2
92	XXIV " " "	1.6	109.65	96.99	93.83	.34	.373	.356	23.3
93	XXV " " "	.8	52.73	48.34	45.18	.42	.222	.205	27.8
94	XXV " " "	1.6	123.71	108.51	105.35	.36	.445	.428	27.8
95	XXVI " " "	.8	63.59	58.41	55.25	.46	.293	.276	36.6
96	XXVI " " "	1.6	128.37	115.26	112.10	.41	.526	.509	32.9
97	XXVII " " "	.8	45.88	41.82	38.66	.43	.197	.180	24.6
98	XXVIII " " "	.8	65.61	59.61	56.45	.42	.276	.259	34.5
99	XXVIII " " "	1.6	123.27	109.83	106.67	.40	.493	.476	30.8
100	XXIX " " "	.8	68.17	62,31	59.15	.39	.266	.249	33.2
101	XXIX " " "	1.6	141.38	124.26	121.10	.45	.636	.619	39.7
102	A. Castor Pomace	.8	95.38	86 99	83.83	.33	.315	.298	39.3
103	" " "	1.6	107.40	97.84	94.68	.47	.505	.488	31.6
104	" " "	2.4	136.93	127.04	123.88	.69	.945	.928	39.0
105	" " "	3.2	115.98	107.49	104.33	.99	1.148	1.131	32.8
106	B. Castor Pomace	.8	89.97	83.48	80.32	.39	.351	.334	43.9
107	" " "	1.6	151.13	140.10	136.94	.45	.680	.663	42.5
108	" " "	2.4	153.28	140.91	137.75	.79	1.211	1.194	50.5
109	" " "	3.2	166.53	155.17	152.01	.90	1.499	1.482	46.8
110	Cotton Seed Meal	.8.	82.45	74.81	71.65	.40	.330	.313	41.2
111	" " "	1.6	125.37	116.36	113.20	.47	.589	.572	36 8
112	" " "	2.4	152.21	140.23	137 07	.74	1.126	1.109	47.0
113	" " "	3.2	156.37	143.55	140.39	.74	1.157	1.140	36.1
114	Dry Ground Fish	.8	80.20	73.21	70.05	.37	.297	.280	37.1
115	" " "	1.6	123.38	114.74	111.58	.43	.531	.514	33.2
116	" " "	2.4	114.74	109.12	105.96	.81	.929	.912	38 7
117	" " "	3.2	145.47	132.60	129.44	.73	1.062	1.045	33.2
118	XXX Comm'cial Mixed Fertilizer	------	2.79	2.55	-----	.78	.022	.005	---
119	XXXI " " "	.8	90.25	81.89	78.73	.41	.366	.349	45.8
120	XXXI " " "	1.6	149.83	133.02	129.86	.46	.689	.672	44.1
121	XXXII " " "	.8	60.52	55 25	52.09	.45	.272	.255	34.0
122	XXXII " " "	1.6	138.26	124.49	121.33	.39	.539	.522	33.7

TABLE II.—VEGETATION EXPERIMENTS OF 1894. DATA REGARDING FERTILIZERS AND CROPS HARVESTED.—*Continued.*

No. of Pot.	Nitrogen supplied		The Crop.			The Nitrogen in the Crop.			
	In form of	Quantity of nitrogen supplied. (grams.)	Weight of air-dry Crop (exclusive of roots). (grams.)	Weight of water-free Crop. (grams.)	Increase of Crop over Crop of Pots 2, 3 and 4. (grams.)	Per cent of nitrogen in the air-dry Crop.	Total nitrogen of Crop (exclusive of roots). (grams.)	Increase of nitrogen of Crop over that of Crop in Pots 2, 3 and 4.	Of 100 parts of nitrogen in the fertilizer there were recovered in the Crop. (parts.)
123	Tankage	.8	72.22	65.35	62.19	.39	.282	.265	35.2
124	"	1.6	137.29	125.20	122.04	.43	.590	.573	36.9
125	"	2.4	124.90	114 61	110.45	.82	1.024	1.007	42.7
126	"	3.2	99.70	92.09	88.93	1.08	1.077	1.060	34.0
127	Linseed Meal	.8	84.50	81.31	78.15	.39	.330	.313	41.2
128	" "	1.6	127.07	116.27	113.11	.50	.635	.618	39.7
129	" "	2.4	139.75	129.58	126.42	.54	.755	.738	31.5
130	" "	3.2	124.48	114.93	111.77	.73	.909	.892	28.1
131	XXXIII Com'cial Mix'd Fertilizer	.8	74.44	68.09	64 93	.35	.261	.244	32.6
132	XXXIV " " "	.8	85.87	78.16	75.00	.39	.335	.318	41.9
133	Home Mixed Fertilizer	.8	87.43	80.37	77.21	.37	.324	.307	40.5
134	" " "	.8	89.00	80.94	77.78	.33	.294	.277	36.8
135	Raw Leather	.8	2.48	2.26	-----	.55	.014	----	1.7
136	" "	1.6	1.96	1.78	-----	.45	.009	----	0.5
137	Dissolved Leather	.8	83.16	73.26	70.10	.37	.308	.291	38.5
138	Garbage and Leather	.8	27.83	25.67	22.51	.50	.139	.122	17.4
139	" " "	1.6	73.72	65.26	62.10	.35	.258	.241	16.1
140	" " "	2.4	94.07	86.16	83.00	.35	.329	.312	13.7
141	" " "	3.2	103.84	95.69	92.53	.54	.561	.544	17.5
142	Steamed Leather	.8	10.34	9.48	6 32	.46	.047	.030	5.9
143	" "	1.6	14.21	12.89	9.73	.37	.053	.036	3.3
144	" "	2.4	27.60	24.16	21.00	.32	.088	.071	3.7
145	" "	3.2	28.91	26.38	23.22	.40	.116	.099	3.6
146	Roasted Leather	.8	8.20	7.40	4.24	.49	.040	.023	5.0
147	" "	1.6	17.25	15.19	12.03	.41	.071	.054	4.4
148	Dried Blood	1.6	106.38	97.79	94.63	.43	.457	.440	28.6
149	" "	1.6	135.35	124.40	121.24	.37	.501	.484	31.3

Influence of the Water Content of the Soil during growth, on Crop Production.

(Pots 14, 16, 18, 22, 20 and 15, 17, 19, 23, 21.)

The "water-holding capacity of the soil" was determined as follows:

Each pot when filled for experiment held 4876 grams ($10\frac{3}{4}$ pounds) of artificial soil.

Water was poured on the surface of the soil of a single pot till the soil was saturated and water ran off through the drainage tube. When the draining ceased, the pot and contents were weighed.

It appeared that the 4876 grams of soil would hold 3892 grams ($8\frac{57}{100}$ pounds) of water.

In following paragraphs, for brevity, the water supply is described as "80 to 60 per cent." etc. This signifies that the pot referred to never contained more than 80 per cent. nor less than 60 per cent. of 3892 grams of water, i. e., its water-content never exceeded 3113 grams (110 ounces) nor fell below 2335 grams (82 ounces).

The pot was placed on the scales from day to day and whenever its weight showed that it contained but 82 ounces of water enough was added to bring the amount up to 110 ounces.

About one-half of this water was carefully distributed over the surface of the soil and the remainder was poured through the tube to the bottom of the pot.

The results of the observations on the Water Content of the Soil may be tabulated for comparison as follows:

Table III.—Influence of Water Supply on Crop Production.

Nitrogen Supply, .8 Gram in Dried Blood.

No. of Pot.	Water Supply,	Crop Increase. grams.	Nitrogen Increase. gram.
14	80—60 per cent.	76.9	.310
16	70—50 "	93.5	.340
18	60—40 "	82.6	.325
22	50—30 "	73.4	.317
20	80—40 "	88.8	.355

NITROGEN SUPPLY, 1.6 GRAMS IN DRIED BLOOD.

15	80—60 per cent.	148.3	.607
17	70—50 "	141.9	.579
19	60—40 "	121.0	.583
23	50—30 "	126.3	.587
21	80—40 "	128.5	.581

With .8 gram of nitrogen the largest crop increase was secured when the quantity of water in the soil was kept between 70 and 50 per cent. More water, 80-60 per cent. produced less crop. Less water, 60 to 40 per cent. and 50 to 30 per cent. also lessened production. When the water was allowed to fluctuate between 80 and 40 per cent. the crop was a little less than when between 70 to 50 per cent. of water was used.

The same is true of the nitrogen increase, except that the largest quantity was in the crop which received from 80 to 40 per cent. of water.

From 50 to 60 per cent. of water or else from 80 to 40 per cent. would seem to have been the quantity most favorable, with .8 gram of nitrogen in dried blood.

When 1.6 grams of nitrogen in form of blood were applied, the largest crop and the largest quantity of nitrogen was got with 80 to 60 per cent. of water. Somewhat less crop increase was got, with a water content of 70 to 50 per cent.; but 60 to 40, 50 to 30, and 80 to 40 per cent. gave decidedly less crop. It is noteworthy however that the quantity of nitrogen in these crops was nearly the same, despite the fluctuations in the water content of the soil and in the weights of crop.

With 1.6 grams of blood nitrogen, 80-60 per cent. of water appears necessary to secure the maximum effect. With smaller quantities of water however nearly the same amount of nitrogen entered the crop, but dry substance was found in less proportion.

These observations indicate that the quantity of water used in the other experiments of this year (50 to 30 per cent.) may not have been enough to bring the nitrogen of the fertilizers to its full efficiency in crop production.

They also indicate that as the nitrogen supply is increased (the quantities used were .8, 1.6, 2.4, and 3.2) the efficiency of the nitrogen in crop production may have been more and more seriously diminished by deficiency of water.

They further show that a reduction of yield on account of the deficiency of water is not necessarily followed by a reduction in the quantity of nitrogen in the crop.

Where more than .8 gram of nitrogen were used as fertilizer, deductions based on CROP INCREASE are unsafe, because it is probable that the water supply was not in excess of crop requirement.

Where more than 1.6 grams of nitrogen were used as fertilizer, deductions based on NITROGEN INCREASE are probably unsafe.

Was Garden Soil or its Extract helpful to the Assimilation of Organic Nitrogen?

(Pots 22, 28, 31, 23, 29, 32, 24, 25, 30, 33, 34, 35.)

To all the pots, except 28, 29, 30, 31, 32, 33, 34, 35, a definite quantity of water extract of garden soil as described on page 79 was added to ensure a supply of the microbes found in cultivated ground and so possibly to promote decay and nitrification.

To determine whether this addition was advantageous the following comparisons were made.

Pots 22, 23, 24, 25 received the soil extract just referred to.

Pots 28, 29, 30, received no soil extract.

To each of the pots 31, 32, 33, 34 and 35 were added 100 grams of rich garden soil.

Pots 34 and 35 received no additional nitrogen but to all the others nitrogen was supplied in the form of Dried Blood.

Table IV.—Effects of Adding Garden Soil or Soil Extract to the Artificial Soil.

The arrangement of the series and the results obtained are given below.

Pot.	Quantity of Blood Nitrogen.	Addition.	Crop Increase. grams.	Nitrogen in Crop increase. Per ct.	grams.	Per ct.
22	.8 gram.	Soil Extract.	73.4	100*	.317	100*
28	.8 "	Nothing.	76.6	104	.289	91
31	.8 "	100 grams garden soil.	70.2	95	.337	106
23	1.6 "	Soil Extract.	126.3	100*	.587	100*
29	1.6 "	Nothing.	123.7	98	.646	110
32	1.6 "	100 grams garden soil.	114.7	90	.529	90
24	2.4 "	Soil Extract.	132.3	100*	.914	100*
25	2.4 "	" "	138.1		1.013	
30	2.4 "	Nothing.	135.4	100	.976	101
33	2.4 "	100 grams garden soil.	143.8	106	1.026	106
34	none	" "	2.5		.006	
35	none	" "	.3		none	

* Taken as 100 because used in most of the experiments.

With a nitrogen supply of .8 gram the pot without soil or soil extract gave the largest crop increase and that with addition of garden soil, the smallest. The extremes were nine per cent. apart.

The pot with added garden soil showed the largest nitrogen increase, that with nothing added, least. Extreme difference 15 per cent.

When 1.6 grams of nitrogen were supplied the pot that received soil extract had the largest crop increase, the one with added garden soil the smallest. The extremes were ten per cent. apart.

The pot with no soil extract had the largest nitrogen increase, that with added garden soil, the least. Extreme difference 20 per cent.

When 2.4 grams of nitrogen were employed two pots were treated with soil extract.

The crops in these two pots differed in amount by 5 per cent. The amount of the nitrogen differed by 11 per cent.

The results of the three series of experiments are contradictory and the differences are probably within the limits of experimental error. They cannot therefore be regarded as significant.

The crop increase produced by 100 grams of garden soil above is shown to be trifling.

The experiments have not established that the nitrogen of dried blood was made any more available by the admixture of soil extract or of garden earth with the artificial soil.

The results have no bearing on the question whether nitrification is a necessary preliminary to the assimilation of organic nitrogen by the plant.

They only indicate that no artificial inoculation with soil-microbes was necessary to insure assimilation of nitrogen in the culture-trials here described.

Are the Quantities of other Plant Food, Especially Phosphoric Acid and Potash in Excess of the Requirements of the Plants?

(Pots Nos. 22, 45, 46, 47, 48, 49, 36, 37, 23, 38, 39, 40, 41, 23, 42, 43, 44.)

If so, then the crop, so far as the supply of plant food is concerned, is limited only by the quantity of nitrogen which is available.

If however the ingredients named are not in excess, the crop is limited in part by lack of them and the weight of crop is no longer a measure of the availability of the nitrogen.

On this point we have two series of experiments; in the first of which .8 gram of nitrogen in dried blood were used, and in the second 1.6 grams.

By "normal" quantity of potash (K_2O) is meant 2.04 grams the amount used in all the experiments of 1894 with the exceptions presently to be noted.

The "normal" quantity of phosphoric acid (P_2O_5) (also used in all the experiments of 1894 with the exceptions noted here) was 1.18 grams.*

The results of the first series, in which .8 gram nitrogen were used are as follows:

TABLE V.—EFFECTS OF DIFFERENT QUANTITIES OF PHOSPHORIC ACID AND POTASH, ON CROP PRODUCTION.

			Crop increase.		Nitrogen.	
			grams.	p. c.	gram.	p. c.
Pot 22,	Normal phosphoric acid,	Normal potash,	73.4	100	.317	100
45,	"	1¼ "	79.5	109	.304	96
46,	"	1½ "	87.4	119	.300	94
47,	1¼ Normal phosphoric acid,	Normal potash,	72.6	99	.331	104
48,	1.7 "	"	81.9	111	.308	97
49,	1.7 "	1½ "	86.7	118	.316	99

A study of these results shows that when potash was present in one fourth more than "normal" quantity as in pot 45, there was a crop-increase of 9 per cent. Potash in one-half more than normal quantity, (pot 46) made a further crop-increase of 10 per cent. The first crop-increase is perhaps within the limits of error but the second, taken with the first, indicates that with more potash the crops would have been larger.

Phosphoric acid was plainly in excess. The observed gain in pot 48 is nearly within the limits of error and the gain in pot 49 is accounted for fully by the extra potash present.

The nitrogen-increase, however, was not affected by either potash or phosphoric acid in excess of the normal quantities.

It appears that potash was not in relative excess when used in "normal" quantity *judging from the total crop increase,* but that with 0.8 gram of nitrogen in the fertilizer the total nitrogen of the crop is a fair measure of the availability of the nitrogen of the fertilizer.

* See page 78.

The results of the second series, with 1.6 grams of nitrogen are as follows :

TABLE VI.—EFFECTS OF DIFFERENT QUANTITIES OF PHOSPHORIC ACID AND POTASH ON CROP PRODUCTION.

			Crop increase.		Nitrogen.	
			grams.	per cent.	gram.	per cent.
Pot 23	normal phos. acid,	normal potash,	126.3	100	.587	100
36	" " " ½ "	"	117.3	93	.509	87
37	" " " ¾ "	"	115.5	91	.511	87
38	" " " 1¼ "	"	109.7	87	.551	94
39	" " " 1½ "	"	124.5	98	.544	92
40	½ normal phos. acid,	normal potash,	107.0	85	.498	85
41	¾ " " "	"	125.8	99	.542	92
42	1¼ " " "	"	122.8	97	.565	96
43	1.7 " " "	"	129.4	102	.630	107
44	1.7 " " " 1½	"	118.8	94	.536	91

In these tests neither less potash than the normal quantity, nor more than the normal, produced any striking difference in the quantity of crop. The cause of the smaller crop in pot 38 as compared with the crops in 37 and 39 does not appear.

Less potash than the normal quantity, was attended with less assimilation of nitrogen while increase of potash above normal did not increase the nitrogen of the crop.

One half the normal quantity of phosphoric acid in the fertilizer gave less crop-increase and less nitrogen-increase than normal while increase of the phosphoric acid of the fertilizer above normal made no appreciable change either in quantity of crop or crop-nitrogen. When *both* potash and phosphoric acid of the fertilizer were increased above normal (pot 44), no increase of crop or crop-nitrogen followed.

The "normal" potash supply was shown to be too small for maximum crop production in the cases where .8 gram of nitrogen were used, but where 1.6 grams of nitrogen were present the normal amount of potash does not appear deficient. It is hardly conceivable that potash should be relatively deficient with the less quantity of nitrogen, but not deficient with a larger quantity, unless the effect of the larger quantity of nitrogen is limited by some other factor.

Now it has been already shown on page 89 in studying the relations of water to crop production that when 1.6 grams of nitrogen in form of blood were used with the quantity of water

which was supplied to the pots now under discussion, the crop production, *but not the crop-nitrogen*, was limited by the water.

The water was not in excess of the crop requirements.

This furnishes the explanation of the results here given.

When .8 gram nitrogen was supplied, the water supply was in excess of the crop requirements and the "normal" potash ration was slightly deficient for maximum crop production.

When 1.6 grams nitrogen were supplied, the water supply was slightly deficient, the nitrogen consequently did not come to its full working in crop production and therefore the "normal" potash ration was not the factor which limited production.

The experiments above described are preliminary to those which form the main subject of this paper.

Their object is to determine whether the supply of plant food and of water has been so chosen that both are in relative excess and how far the differences in weight of crops observed in the experiments to be described later may justly be attributed to the quality and quantity of the nitrogen supply.

These results may be summarized as follows:

1. The inoculation of the artificial soil with either soil extract or garden soil was without effect and therefore unnecessary.

2. FOR THE ASSIMILATION OF NITROGEN the "normal" water supply was sufficient or in excess when .8 gram or 1.6 grams nitrogen were used in the fertilizer. There are no data to demonstrate whether with 2.4 or 3.2 grams of nitrogen, the water supply was deficient.

3. FOR MAXIMUM CROP PRODUCTION, the water supply was probably scarcely sufficient when .8 gram. nitrogen were used and was no doubt somewhat deficient when 1.6 grams nitrogen were employed.

4. FOR THE ASSIMILATION OF NITROGEN the "normal" quantity of potash was certainly in excess of the plant requirements when .8 gram nitrogen were used in the fertilizer and was probably also in excess when 1.6 grams nitrogen were present.

5. FOR MAXIMUM CROP PRODUCTION potash was deficient in all cases.

6. In the following experiments no conclusions as to the availability of nitrogen are safe where more than 1.6 grams of nitrogen were used in the fertilizer.

7. The quantity of nitrogen taken up by the crop is a fairer measure of its availability than the total weight of the crop.

The Relative Availability of Nitrogen in certain Raw Materials commonly used in Fertilizers.

(Pots 5, 6, 7, 8, 9, 10, 11, 12, 13, 22, 23, 24, 25, 26, 27, 102 to 117 (both inclusive) and 123 to 130 (both inclusive).

The nitrogenous matters used in these experiments were the following:

Commercial nitrate of soda, slightly dried to facilitate grinding and weighing and containing 16.15 per cent. of nitrogen.

Dried Blood, bought from a dealer in fertilizers, which contained 13.2 per cent. nitrogen.

Castor Pomace, A, a ground residue left after the removal of oil from the castor bean (*Ricinus*). The sample contained 5.4 per cent. of nitrogen.

Castor Pomace, B, another sample, containing 5.56 per cent. of nitrogen.

Cotton Seed Meal. Bright yellow meal from the Conn. market, containing 7.38 per cent. of nitrogen.

Dry Ground Fish, containing 9.34 per cent. of nitrogen.

Ground Horn and Hoof from Chicago. See description on page 20, containing 15.59 per cent. of nitrogen.

Tankage, bought in New Haven, which contained 4.17 per cent. of nitrogen.

Linseed Meal, used extensively in this State as a cattle food but also, among tobacco growers, as a fertilizer. It contained 5.75 per cent. of nitrogen.

All of the above materials were pulverized to pass circular holes $\frac{1}{50}$ inch in diameter.

For the most part four pots were devoted to tests of each material and each was used in such quantity as supplied .8, 1.6, 2.4 and 3.2 grams of nitrogen to the four pots respectively.

The quantities of other plant food supplied are given on page 78.

Nitrate of soda is taken as the standard of comparison.

The following table shows the amount of crop increase (over the crop in pots which received no nitrogen) obtained by the use of .8 gram of nitrogen in the nitrogenous matters named and also the amount of nitrogen increase; both being expressed in grams.

The last two columns give the relative crop and nitrogen increase, as compared with the increase obtained from nitrate of soda which is called 100 per cent.

Table VII.—Comparative Availability of Nitrogen in Various Fertilizers.

Crop Increase with .8 gram Nitrogen.

Pot.	Source of Nitrogen.	Crop Increase. grams.	Nitrogen Increase. gram.	Relative Crop Increase when Nitrate = 100 p. c. Crop. per cent.	Nitrogen. per cent.
9	Nitrate of Soda	96.7	.367	100	100
22	Dried Blood	73.4	.317	75.9	86.4
102	Castor Pomace A	83.8	.298	86.7	81.2
106	Castor Pomace B	80.3	.334	83.0	91.0
110	Cotton Seed Meal	71.7	.313	74.1	85.3
114	Dry Fish	70.1	.280	72.5	76.3
5	Horn and Hoof	70.9	.290	73.3	79.0
123	Tankage	62.2	.265	64.3	72.2
127	Linseed Meal	78.2	.313	80.8	85.3

In Table VIII are given the corresponding experiments made with the double quantity of nitrogen, 1.6 grams.

Table VIII.—Comparative Availability of Nitrogen in Various Fertilizers.

Crop Increase with 1.6 grams Nitrogen.

Pot.	Source of Nitrogen.	Crop Increase.	Nitrogen Increase.	Relative Crop Increase when Nitrate = 100 p. c. Crop.	Nitrogen.
10	Nitrate	137.7	.850	100	100
23	Dried Blood	126.3	.587	91.8	69.1
103	Castor Pomace A	94.7	.488	68.7	57.5
107	Castor Pomace B	136.9	.663	99.4	78.0
111	Cotton Seed Meal	113.2	.572	82.2	67.3
115	Dry Fish	111.6	.514	81.0	60.5
6	Horn and Hoof	115.8	.544	84.0	63.9
124	Tankage	122.0	.573	88.6	67.4
128	Linseed Meal	113.1	.618	82.1	72.7

We may now inquire what conclusions are justified regarding the availability of nitrogen in the various forms here under experiment.

The most accurate data are probably those of Table VII with the smaller quantity of nitrogen.

Regarding the *total crop increase* produced, it appears that the two kinds of Castor Pomace gave 86.7 and 83 per cent. of the crop which nitrate of soda gave, and larger crops than any of the other fertilizers.

Linseed Meal ranked next, and but little below the Castor Pomace, 80.8 per cent.

Then followed Dried Blood 75.9, Cotton Seed Meal 74.1, Horn and Hoof 73.3, Dry Fish 72.5 per cent.

Tankage is at the foot of the list, producing only 64.3 per cent. of the crop produced by nitrate of soda used in equivalent quantity.

Regarding in the next place the *nitrogen increase* it appears that next to nitrate came Castor Pomace B, 91.0 per cent.

Next, and nearly alike, were Dried Blood (86.4), Cotton Seed Meal (85.3) and Linseed Meal (85.3).

Somewhat below these ranked Castor Pomace A, 81.2 per cent., and Horn and Hoof, 79.0 per cent.

Then followed Dry Fish, 76.3 per cent. and last of all Tankage of whose nitrogen only 72.2 per cent. had been assimilated as compared with that yielded by nitrate of soda.

As appears from the conclusions on page 93 the only other data, which can fairly be used in discussing the relative value of nitrogen in these materials are the yields of nitrogen from those crops raised with the double quantity of this element.

An examination of these figures given in Table VIII, page 95, shows that Castor Pomace B, ranked next to Nitrate of Soda in respect of the assimilation of its nitrogen by the crop, 78 per cent.

Considerably below this was the availability of nitrogen in Linseed Meal 72.7, and Dried Blood 69.1.

A little lower ranked Tankage 67.4, and Cotton Seed Meal 67.3. Next lower was Horn and Hoof 63. 9, Fish 60.5, and last of all the Castor Pomace A 57.5.

The indications of these three sets of figures are sufficiently alike to warrant averaging the per cents. found, to obtain a general numerical expression of the result of the tests.

Such an average shows that under the conditions of this experiment, of the organic forms of Nitrogen, Castor Pomace B was the most available, 85 per cent., when nitrate of soda equals 100 per cent. Somewhat less available was the nitrogen of Linseed Meal, 80.0 and of Blood 77 per cent.

Next came Cotton Seed Meal, 76, Castor Pomace A, 74, and Horn and Hoof, 72 per cent.

Last came Dry Fish, 70, and Tankage, 68.0 per cent.

Extended discussion of these results is reserved till the tests have been repeated under varying conditions.

There are two or three particulars however to which attention may be called at the present time.

It is noteworthy that the nitrogen of one sample of Castor Pomace was very much more available than that of the other.

The reason of this difference it has not yet been possible to discover.

The nitrogen of Dry Fish and Tankage had a lower availability in these experiments than that of blood and the vegetable nitrogenous matters, rather lower indeed than horn and hoof. This is quite contrary to the popular estimate of the relative value of dried fish. It is generally regarded as one of the most active forms of nitrogen. Perhaps the same is true of tankage. This sample of tankage contained 4.17 per cent. of nitrogen and was therefore a "bone tankage" differing little in composition from ground bone and had undoubtedly been subjected to cooking and drying at a temperature of about 212° Fahr.

It will be noticed in Table IX, given on page 100, that Wagner finds from three years' experiments that the nitrogen of both blood and castor pomace is more fully available than that of either fish guano, steamed bone meal or "flesh meal;"—results which in general are confirmed by these trials.

These facts remind us of the insolubility or slowness of solution of dry ground fish and tankage in pepsin solution as contrasted with dried blood and raw bone; Report for 1893, pp. 220 and 222. Also Report for 1885, pp. 124–127. (Note the higher solubility of fresh-cooked menhaden, Fish No. 1598, Report 1885, page 123 and conclusion on page 126.)

It appears that some animal matters which yield gelatine (glue), viz: those of bone, of tendon, cartilage, hide, and the various intestinal membranes, are rendered less soluble and digestible by cooking or steaming; while others, constituting wool, hair, horn and hoof are made more soluble or digestible by cooking or steaming. In case of the former, the glue produced by the action of hot water or steam, makes a solution which impregnates the undissolved matter, and when the whole is dried fills the pores and covers and cements together the particles with a material which is quite insoluble in water of ordinary temperature so that the porosity of the whole mass is greatly diminished. In consequence of this, the material when steamed and dried dis-

solves less readily, decays much more slowly,—is less "available" to plants—than it was in its fresh or raw condition.

These remarks, of course, do not apply to processes which remove the glue quite completely from the material before drying. On the other hand, in case of wool, hair, horn and hoof, heating or steaming at the temperature usually employed produces no glue which may afterwards lessen porosity, but destroys the toughness and elasticity of these materials. Before steaming they are pulverized with the greatest difficulty; after steaming they are brittle and readily reduced to a fine powder. Thus the same process which makes fish and tankage less easy to pulverize, slower to dissolve, digest and decay, and less available to plants, makes horn and hoof, hair and wool, more easily pulverizable, quicker to decay and more available as plant food.

In the Report of this Station for 1886, page 88, is described a vegetation experiment on the agricultural value of horn shavings and horn and hoof. In this test, oats were grown in pots filled with a natural soil.

The outcome of that experiment is stated as follows: "The results are too irregular to justify any fine conclusions, but the average increase both of dry matter and of nitrogen is seen to be twice as much in the case of blood-nitrogen as in that of horn-nitrogen." . . . . "In these experiments both horn and hoof and horn shavings proved to be of very inferior value as fertilizers in comparison with dried blood."

In the experiments of this year, on the contrary, the nitrogen of ground horn and hoof was nearly as effective as that of dried blood.

In the experiments of 1886 the availability of blood-nitrogen was to that of horn-nitrogen as 100 to 46½. In the experiments of 1894 the relation was 100 to 93. There are two considerations which may fully explain this seeming discrepancy.

In 1886 the crop raised was oats; the time of growth was from May 3d to July 28th, a period of 79 days; and the temperature during the time of growth was comparatively low.

In 1894 the crop raised was maize; the time of growth was from June 16th to Aug. 28th, a period of 73 days; and the temperature during growth was exceptionally high.

While the time of growth was about the same for the two crops that time in the case of corn fell in the very warmest part of summer, while the oats grew in much cooler weather, and pre-

sumably the putrefactive and nitrifying processes within the soil were very much less active than six weeks later, at the time when the maize crop was most rapidly growing.

The other fact which explains the differences noted between the the availability of the nitrogen of horn and hoof in 1886 and in 1894 is that the character of the material used in the two series of experiments was quite different.

The horn and hoof samples used in the tests of 1886 were turnings from factories, raw or unsteamed and extremely hard to pulverize.

The firm who furnished the horn and hoof used in the tests of 1893 stated that it had been steamed. It was, at all events, a brittle material, totally different in texture from the other and very easily ground to a fine powder.

While the horn and hoof was ground to pass a $\frac{1}{50}$ inch mesh for both series of experiments it is quite certain that the preparation used in 1893 was on the whole much finer than the other and probably for this reason was more quickly decomposed and rendered available to plants.

Before leaving this subject we may cite the results of vegetation experiments made by Wagner* on the relative availability of nitrogen in various fertilizer materials.

The crops under experiment were summer rye, with flax following, summer wheat, and carrots. The tests were made on small plots of ground.

Expressing the nitrogen increase obtained by use of nitrate of soda as 100, the relative increase from the other materials was as follows:

* Die Stickstoffdüngung der Landwirtschaftl. Kulturpflanzen, 246.

TABLE IX.—RESULTS OF WAGNER'S EXPERIMENTS. THE RELATIVE AVAILABILITY OF VARIOUS FORMS OF ORGANIC NITROGENOUS MATTER.

	In experiment of the first year.	Average of first and second year's experiment.	Average of first, second and third year's experiment.
Nitrate of Soda	100	100	100
Sulphate of Ammonia	85	74	88
Peruvian Guano	84	88	80
Blood Meal	67	67	69
Castor Pomace	62	65	67
Green Crop Manure	62	60	68
Horn Meal	63	61	63
Fish Guano	51	59	64
Steamed Bone Meal	42	53	61
Flesh Meal	44	47	54
Wool Dust	27	28	33
Stable Manure	11	16	32
Leather Meal	13	12	20

The experiments made in *pots* with oats, carrots and summer rye gave results not essentially different from these.

Wagner says in discussing the figures above given: "Of course these statements of value can only represent approximately the availability of these nitrogenous matters in comparison with nitrate of soda. It would be foolish to attempt a numerical expression which should be absolutely correct in all cases.

Under conditions more favorable to the decay and nitrification of organic matters, than prevailed in our tests,—if the soil is richer in humus or lime, lighter, warmer, etc., or if a crop is grown, which has a longer period of growth and with it a greater capacity for assimilating nitrogen—then the above figures will be somewhat higher, and on the other hand (under less favorable conditions), lower."

THE RELATIVE AVAILABILITY OF NITROGEN IN VARIOUS PREPARATIONS OF LEATHER.

A considerable number of methods have been tried in this country and abroad to destroy the tannic acid and render the nitrogen of leather available to plants.

A bibliography of this subject up to date, prepared by Dr. J. B. Lindsey of the Massachusetts Station, may be found in Agricultural Science, Vol. VII, No. 2, p. 50.

As various preparations of leather are to be had in our markets at comparatively low rates, the following experiments were made

to test the effect of roasting, steaming and acidulating leather on the availability of its nitrogen.

The preparations used were as follows:—

1. Leather and garbage. This material, which is fine and easily pulverized, contains a considerable proportion of leather, but we have no precise information regarding its source or method of manufacture. It was purchased for us from a broker. The sample contained 7.26 per cent. of nitrogen.

2. Raw leather (hemlock-tanned, sole leather chips) ground to a fine powder, which contained 6.61 per cent. of nitrogen.

3. Roasted leather, made from the same raw leather by powdering and heating in an air bath at 240° C. for four hours. It contained 10.24 per cent. of nitrogen.

4. Steamed leather, prepared from the same raw leather, by heating over water in the autoclave for $1\frac{3}{4}$ hours at a pressure of 58 pounds to the square inch. It formed a gummy mass which after drying at 100° C. in a water bath became friable, and contained 7.11 per cent. of nitrogen.

5. Dissolved leather, obtained as follows: To 36 parts of hot oil of vitriol, free from nitrogen, were gradually added, with constant stirring, 32 parts of pulverized raw leather, like No. 2 above mentioned. This was more than the acid would at once blacken. The mass was rubbed thoroughly together and heated till fumes of sulphurous acid began to appear. The acid was then nearly neutralized with carbonate of lime and the mixture was dried on the water bath till it became friable. It contained 2.07 per cent. of nitrogen and gave no reaction for tannic acid when tested in the usual way with iron-salt.

TABLE X.—COMPARATIVE AVAILABILITY OF NITROGEN IN VARIOUS PREPARATIONS OF LEATHER.

Pot No.		Quantity of Nitrogen in Fertilizer.	Crop Increase.	Nitrogen Increase.	Relative Crop Increase when Nitrate = 100 per cent.	Relative Nitrogen Increase when Nitrate = 100 per cent.
9	Nitrate of Soda	.8	96.72	.367	100	100
10	" "	1.6	137.71	.850	100	100
138	Leather and Garbage	.8	22 51	.122	23.3	33.2
139	" " "	1.6	62.10	.240	45.1	28.3
135	Raw Leather	.8	none	none	none	none
136	" "	1.6	none	none	none	none
142	Steamed Leather	.8	6.32	.030	6.5	8.1
143	" "	1.6	9.73	.036	7.0	4.2
146	Roasted Leather	.8	4.24	.023	4.4	6.3
147	" "	1.6	12.03	.054	8.8	6.3
137	Dissolved Leather	.8	70.10	.291	72.5	79.3

It appears that raw leather finely pulverized was absolutely inert under the conditions of this experiment, that steamed and roasted leather were so slowly available as to be nearly worthless but that the nitrogen of leather which had been heated with more than its own weight of oil of vitriol was as available as that of dry fish or horn and hoof. This last result, of a single test, needs confirmation.

The nitrogen in the mixture of leather and garbage was less than half as available as that of fish, or horn and hoof.

The Availability of the "Organic" Nitrogen of Mixed Fertilizers.

Under the general name of "animal matter" a considerable number of inferior or perhaps nearly worthless nitrogenous manufacturing wastes are now offered to makers of commercial fertilizers. Very often nothing can be learned regarding their nature, or fertilizing value. Some of them moreover can be mixed with dried blood or with tankage in considerable quantity without betraying their presence on casual examination.

It is an important question whether any considerable amount of this suspicious material enters into our market in mixed goods.

In 1893 this Station tested every mixed fertilizer that came into the laboratory, by determining how soluble its organic nitrogenous matter was in water and pepsin-hydrochloric acid.* The result of this study was follows :

"Of the 125 brands of mixed fertilizers examined, this method accordingly finds that 105 were above suspicion, 12 were near the danger line, and 8 were to be suspected of containing some comparatively worthless form of organic nitrogen. The method cannot at present do more than create a strong presumption for or against the quality of the goods."

It was decided this year to test if possible the value of the organic nitrogen of certain mixed fertilizers by practical pot cultures.

For this purpose it was needful to separate the organic nitrogen from accompanying nitrates and ammonia salts as well as from fully soluble phosphates, potash, etc.

This was accomplished by washing with water as follows: 250 grams of each fertilizer were shaken in a fruit jar with 300^{cc} of cold water and after standing some time 200^{cc} of the liquid were poured off through a paper filter, 200^{cc} of water were added to

* Rept. Conn. Exp't. Station, 1893, 223.

the residue in the jar, shaken, let stand until nearly clear and poured off as before. This process was repeated six times.

The residue was then brought on the filter and washed sufficiently to collect all the solid particles. The residue was then dried, separated from the filter, weighed, ground and sifted to pass circular holes $\frac{1}{25}$ inch in diameter.

Nitrogen was determined in this washed residue as well as in the original material.

It is therefore possible to compute the quantity of organic nitrogen which was undissolved by water during the washing process.

Of the thirty-nine mixed fertilizers tested, the proportion of organic nitrogen undissolved by washing with cold water was

In 1 case	more than				95	per cent.
" 7 cases	between	85	and	90	"	
" 5 "	"	80	"	85	"	
" 6 "	"	75	"	80	"	
" 4 "	"	70	"	75	"	
" 7 "	"	65	"	70	"	
" 5 "	"	60	"	65	"	
" 3 "	"	60	"	40	"	
" 1 "	less than			40	"	

It appears then that in washing, a considerable portion of the organic nitrogen has in most cases been dissolved.

The vegetation tests are therefore made only *on that portion of the organic nitrogen which was undissolved by cold water.*

Certain preliminary experiments had indicated that the solubility of the organic nitrogen was not nearly so great as it proved to be in many cases. The results are accordingly less valuable than was expected.

The general result of the vegetation test made with twenty-seven mixed fertilizers is as follows:

In fifteen of the fertilizers, the part of the organic nitrogen which was undissolved by cold water appeared to be rather less available than that of dried blood.

If the availability of nitrogen in nitrate of soda is called 100, and of that of Blood 77, then the availability of the nitrogen of these fifteen fertilizers is between 60 and 70.

In one other case						the relative nitrogen availability was		78	.0
" two others						" between	55	and	60
" four	"	"	"	"	"	"	50	"	55
" two	"	"	"	"	"	"	45	"	50
" two	"	"	"	"	"	"	40	"	45
" one	"	"	"	"	"	"	35	"	40

While it is true that this statement refers only to a portion of the organic nitrogen,—the part which was undissolved by cold water,—it is nevertheless evident that there are very decided differences in the availability to plants as well as in the solubility in water of the organic nitrogen of mixed fertilizers. These differences we believe can only be demonstrated by vegetation experiments made in general like those here described.

Field tests, as usually conducted are quite unfit for this purpose, however useful they may be in other ways.

In future experiments it is hoped that the entire organic nitrogen of mixed fertilizers may be practically tested in pot culture. Further discussion of the results of the present year is therefore reserved.

In concluding the account of our vegetation experiments it may be well to supplement the description, by a few illustrations.

The accompanying plates, III, IV, V and VI, show the appearance of five cultures at four different periods of growth.

Pot 9 received at planting time, June 17, .8 gram (12 grains) of nitrogen in form of nitrate of soda while the other pots 1, 2, 3 and 4 had no nitrogen except what came from the seed, and the very small quantity which the artificial soil supplied. In all other respects the soil of the five pots was fertilized in the same manner.

The first picture, Plate III, was taken July 20th.

No. 9 had reached a height of about 57 inches, the foliage was dark green and the whole appearance very thrifty. Nos. 1, 2, 3 and 4 were about 14 inches high, the leaves were yellowish or reddish, growth was at a standstill, and as new leaves developed, the old ones withered.

On August 6th, there was added to the soil of No. 1, .8 gram of nitrogen in form of nitrate of soda.

Within four days the color of the foliage improved and on August 16th, the second picture was taken, Plate IV. It is quite evident here that new growth has begun, and that the plant which showed most strength appropriates the nitrogen supply most promptly and effectively under the changed conditions. The other three plants have made no appreciable growth.

The next two pictures Plates V and VI show the appearance of this series on Aug. 28 and Sept. 18. In the meantime the crop of pot 3 had been harvested.

The plants in pot 1 made good growth, though of course greatly

PLATE III. Effects of Nitrate of Soda.

PLATE IV. Effects of Nitrate of Soda.

PLATE V. Effects of Nitrate of Soda.

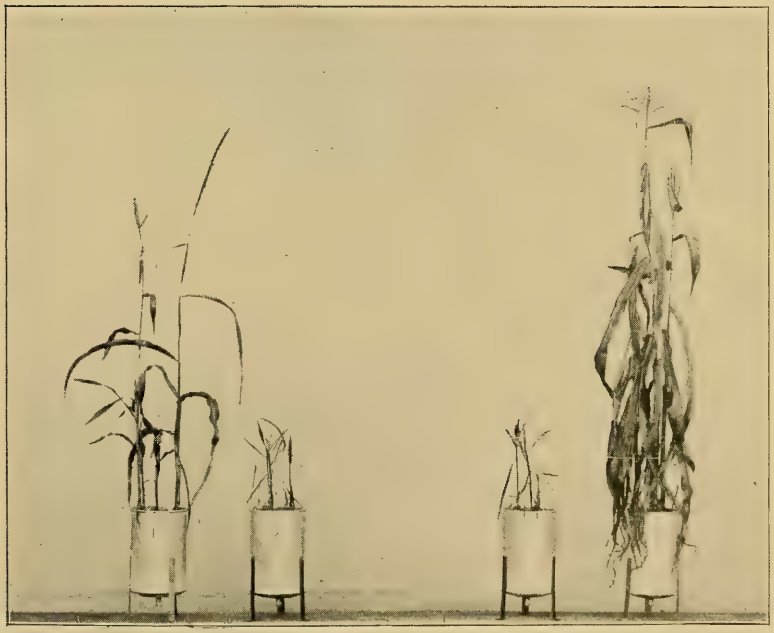


PLATE VI. Effects of Nitrate of Soda.

No Nitrogen. | Raw Leather. | Leather and Garbage. | Steamed Leather. | Roasted Leather. | Dissolved Leather.

PLATE VII.

inferior to those in pot 9, and two of them developed diminutive ears.

The plants in 2 and 4 stood without any real growth through the whole season.

Plate VII shows the relative value of the different preparations of leather described on page 101. Beginning at the left of the picture, pot No. 2, received no nitrogen, pot 136, received 1.6 grams of nitrogen in form of pulverized raw leather, pot 139 received the same quantity of nitrogen in "leather and garbage," pot 144 received steamed leather, pot 147, roasted leather and pot 137 received only half as much nitrogen as the others, but in form of "dissolved leather."

The picture as well as the analytical results indicate that raw leather was rather worse than useless as a source of nitrogen, that the nitrogen of roasted and steamed leather was of very little value as as a fertilizer, "leather and garbage" did better than these last, thanks to the garbage ingredients, but dissolved leather did much better than any thing else in the series.

II. RELATIVE SOLUBILITY OF ORGANIC NITROGENOUS MATTERS IN PEPSIN-HYDROCHLORIC ACID.

Raw Materials used in Fertilizers.

For the results of work done in past years on this subject reference may be had to the Seventeenth Report of this Station, 1893, pp. 218–223.

This year the thirteen materials tested by vegetation experiments as described on pages 94 to 96 of the present Report have also been examined as to their solubility in pepsin-hydrochloric acid, in order to ascertain if there was any relation between the relative availability and the relative solubility (in pepsin-solution) of their nitrogen.

The method followed is precisely that described on page 219 of the Seventeenth Report.

The results are given below in Table XI.

TABLE XI.—SOLUBILITY IN PEPSIN-HYDROCHLORIC ACID OF ORGANIC NITROGEN IN VARIOUS RAW MATERIALS.

	Total Nitrogen in per cent. of the substance.	Pepsin-soluble Nitrogen in per cent. of the substance.	Pepsin-soluble Nitrogen in per cent. of total Nitrogen.
Dried Blood	13.20	12.31	93.3
Castor Pomace A	5 40	4.64	86.0
Castor Pomace B	5.56	4.94	88.9
Cotton Seed Meal	7.38	6.59	89.3
Dry Fish	9.34	7.46	81.0
Horn and Hoof	15.59	5.46	35.0
Tankage	4.17	2.84	68.1
Linseed Meal	5.75	5.27	91.6
Leather and Garbage	7.26	2.98	41.0
Raw Leather	6.61	.57	8.6
Steamed Leather	7.11	1.44	20.3
Roasted Leather	10.24	.87	8.5
Dissolved Leather	2.07	.11	5.3

What connection there is between the solubility of these materials in pepsin-solution and the availability of their nitrogen as determined by vegetation experiments may be seen in Table XII.

The second column of this table contains the figures which express the average relative availability of the nitrogen as determined by the vegetation experiments which have been described on pages 94 to 96 and page 101 of this report.

The third column is calculated from the last column of Table XI by multiplying the figures expressing the relative solubility of the nitrogen in pepsin-solution by the factor .826. By this means the figure in the third column (77.1) representing the solubility of the nitrogen of dried blood in pepsin-solution is made the same as that in the second column representing the availability of the nitrogen of dried blood, as determined by vegetation experiments. Hence if there were absolute agreement between the relative availability of the nitrogen and its relative solubility in pepsin-solution, the figures in the third column should be the same as the corresponding ones in the second column.

TABLE XII.—COMPARISON OF NITROGEN AVAILABILITY BY MAIZE AND SOLUBILITY IN PEPSIN-SOLUTION.—RAW MATERIALS.

	Relative Availability.	Relative Solubility in Pepsin-Solution.
Dried Blood	77.1	77.1
Castor Pomace B.	85.2	76.5
Linseed Meal	79.6	75.6
Cotton Seed Meal	75.5	73.8
Castor Pomace A.	73.9	71.0
Horn and Hoof	72.1	28.9
Dry Fish	69.8	66.9
Tankage	67.9	56.2
Leather and Garbage	30.8	33.8
Raw Leather	0.0	7.1
Steamed Leather	6.2	16.8
Roasted Leather	6.3	7.0
Dissolved Leather	79.3	5.3

With three exceptions, the agreement between these two columns of figures is satisfactory.

In general, therefore, the solubility of the nitrogen of these samples in pepsin solution was a fairly good measure of the relative availability of the nitrogen to the corn plant under the conditions of our vegetation experiment.

The difference between the results obtained with castor pomace B. (8.7) is hardly significant. The difference in case of tankage (11.7) is more pronounced.

In the case of horn and hoof the relative availability of the nitrogen is not indicated in the least by its solubility in pepsin solution. The former is represented by the figure 72.1, the latter by 28.9.

The same is true of the dissolved leather, where the availability of the nitrogen is represented by 79.3, the solubility in pepsin by 4.3.

In the case of horn and hoof we believe the discrepancy is one which cannot possibly be attributed to errors of experiment. Our tests previously made are confirmed by the results of this year and prove that pepsin-solution will not under the conditions of the test dissolve more than about 30 per cent. of the nitrogen of horn and hoof.

The results of the four vegetation tests made this year were consistent and showed that the nitrogen of horn and hoof was as available as that of castor pomace, dry fish and tankage.

Wagner's vegetation experiments carried on for three years on small plots of soil and with other crops than maize also showed that the nitrogen of horn and hoof was as available as that of fish guano or bone meal.

But the nitrogen of castor pomace, dry fish, tankage and bone, which in these experiments proved to be no more available to crops than that of horn and hoof, dissolves in pepsin-solution far more readily. Solubility in pepsin-solution is no indication, therefore, of the availability of the nitrogen of horn and hoof.

The sample of dissolved leather contained a very large amount of sulphate of lime produced when the oil of vitriol was neutralized by carbonate of lime, as described on page 101.

Previously to digestion with pepsin-solution the gram portion of dissolved leather was digested for an hour with 250^{cc} of .2 per cent. hydrochloric acid and then washed copiously with cold water. While our experiments have shown (Report, 1885, p. 121), that a very large amount of gypsum interferes considerably with the solvent action of pepsin-hydrochloric acid, it was believed that this preliminary treatment would nearly, if not entirely, remove the excess of gypsum. The tests prove, however, that the nitrogen is almost entirely insoluble in pepsin-solution.

We have, on the other hand, but a single vegetation experiment with this sample, and the result obtained requires confirmation by further experiment.

The Organic Nitrogen of Mixed Fertilizers.

The method of removing ammonia salts and nitrates from mixed fertilizers has been described on page 102.

The vegetation tests, as described on page 103, were made with that portion of the organic nitrogen which was insoluble in cold water.

The following determinations of solubility in pepsin-solution were *also* made on the portion of organic nitrogen insoluble in water, using the same preparations which had been made for the vegetation experiments.

Six fertilizers were selected, Nos. II, V, XI, XII, XVI, and XVIII (pots 51, 52, 57, 58, 68, 69, 70, 71, 78, 81, 82), being those which had shown the lowest nitrogen availability. The method of digestion with pepsin-solution was the same described above. Table XIII presents the results.

The third column of the table is obtained by multiplying the figures of the second column by the factor .826, as described on page 106.

If there were absolute agreement between the tests of relative nitrogen availability and relative nitrogen solubility in pepsin solution, the figures in the third column should be identical with the corresponding figures in the first column. There appears to be no satisfactory agreement between the two.

TABLE XIII.—COMPARISON OF NITROGEN AVAILABILITY BY MAIZE AND SOLUBILITY IN PEPSIN-SOLUTION.—MIXED FERTILIZERS.

	Relative Availability.	Solubility in Pepsin-Solution.	Relative Solubility.
II	52.9	75.3	62.2
V	51.4	64.0	52.8
XI	49.7	73.2	60.5
XII	48.4	67.4	55.7
XVI	39.6	55.0	45.4
XVIII	42.9	83.2	68.7

III. ON THE SOLUBILITY BY PUTREFACTION OF THE NITROGEN OF RAW MATERIALS USED AS FERTILIZERS.

The rapidity with which a nitrogenous substance decomposes by the action of microbe life, under favorable conditions, gives some indication of the value of the material as a source of nitrogen supply to growing plants. Thus leather, an animal tissue rendered proof against rapid decay by tanning, is inert as a fertilizer; but the untanned tissue, which decays readily, is a source of nitrogen available to plants.

Yet the compounds formed from different nitrogenous materials during decay differ in character and are probably not all equally available as plant food.

So that the value of a given nitrogenous substance as a source of plant-nitrogen depends both on the rapidity with which it decomposes in the soil and the nature and relative amount of the substances which are first formed from it (whether ammonia, amido-bodies, ptomaines, nucleins, etc.).

In continuation of work described in our Report for 1893, pages 223 and 228, samples of the same raw materials which have been tested by vegetation experiments, as just described, pages 94

to 96, and page 101 and by pepsin-solution, pages 105 to 108, have also been compared as regards the solubility of their nitrogen under putrefaction.

The method followed was the same described in the Seventeenth Report of this Station, 1893, page 228.

It was in brief as follows:—In a flask of sufficient capacity the substance suspended in water, containing a small quantity of tobacco ashes and having a *very* slight alkaline reaction, and sterilized by boiling, was inoculated with an extract of mixed manure and putrefying meat.

The flask was kept at 30°–40° C. for four weeks. The extent of decomposition was determined after two weeks and again after four weeks, as shown in Table XIV, which presents the results of the experiments in detail.

Under this putrefactive process which was certainly most favorable to rapid decomposition those forms of nitrogenous matters which are most valued as fertilizers (excepting tankage) had yielded up a half of their nitrogen or more in form of ammonia, and a considerably larger proportion of it had become soluble in water.

During the experiment in some cases a considerable quantity of nitrogen escaped from the flasks, presumably as carbonate of ammonia.

TABLE XIV.—SOLUTION OF ORGANIC NITROGEN DURING PUTREFACTION.

	Dried Blood.	Castor Pomace B.	Linseed Meal.	Cotton Seed Meal.	Castor Pomace A.	Horn and Hoof.	Dry Fish.	Tankage.	Leather and Garbage.	Raw Leather.	Steamed Leather.	Roasted Leather.	Dissolved Leather.
Nitrogen in Sample	13.20	5.56	5.75	7.38	5.40	15.59	9.34	4.17	7.26	6.61	7.11	10.24	2.07
After 14 days. Nitrogen in Solution as Ammonia	6.68	3.18	2.42	3.52	2.60	3.05	4.72	1.66	1.96	.36	.68	.18	.68
" " " organic	2.29	.93	.72	1.02	1.10	2.63	1.64	.63	1.42	.66	1.09	.10	.12
Total	8.97	4.11	3.14	4.54	3.70	5.68	6.36	2.29	3.38	1.02	1.77	.28	.80
Per cent. of the total Nitrogen gone into Solution	68.0	73.9	54.6	61.5	68.5	36.4	68.1	55.0	46.5	15.4	24.9	2.7	38.6
After 30 days. Additional Nitrogen in Solution as Ammonia	.61	.17	.15	.35	.16	.80	.03	.48	.35	.65	.07	.08	.00
Additional Nitrogen in Solution, organic	.57	.29	.58	.12	.26	.24	.78	.15	.26	.27	.07	.06	.07
Per cent. of total Nitrogen gone into Solution since the previous filtration	8.9	8.3	12.7	6.3	7.7	6.6	8.6	15.1	8.4	13.9	1.9	1.3	3.3
Per cent. of total Nitrogen in Solution as Ammonia	55.2	60.2	44.7	52.4	51.1	24.7	50.8	51.3	31.8	15.3	10.5	2.5	32.8
Per cent. of Nitrogen in Solution, organic	21.6	21.9	22.6	15.4	25 2	18.4	25.6	18.7	23.1	14.1	16.3	1.5	9.1
" " " escaped*	14.6	1.9	9.1	5.9	8.9	4.9	8.0	3.6	4 2	0.0	1.3	8.1	0 1
" " " left undissolved	8.6	16.0	23.6	26.3	14.8	52.0	15.6	26.4	40.9	70.6	71.9	87.8	58 0
	100 0	100.0	100 0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Escaped into the air as ammonia or other gas.

To compare these results with those given in Table XII, page 107, the solubility of dried blood under putrefaction (91.4 per cent.) is called 77.1 per cent. as in Table XII, and the solubilities of all the other materials are *correspondingly* reduced. Hence if there were perfect agreement between the relative solubility in pepsin solution and under putrefaction there would be perfect agreement between the corresponding figures. The comparison appears in Table XV.

TABLE XV.—COMPARISON OF NITROGEN AVAILABILITY BY MAIZE, SOLUBILITY IN PEPSIN-SOLUTION, AND SOLUBILITY IN PUTREFACTION.

	Relative Availability.	Relative Solubility	
		In pepsin-solution	By putrefaction.
Dried Blood	77.1	77.1	77.1
Castor Pomace B	85.2	76.5	70.8
Linseed Meal	79.6	75.6	64.4
Cotton Seed Meal	75.5	73.8	62.1
Castor Pomace A	73.9	71.0	71.8
Horn and Hoof	72.1	28.9	40.4
Dry Fish	69.8	66.9	70.9
Tankage	67.9	56.2	62.1
Leather and Garbage	30.8	33.8	49.8
Raw Leather	0.0	7.1	24.8
Steamed Leather	6.2	16.8	23.7
Roasted Leather	6.3	7.0	10.3
Dissolved Leather	79.3	5.3	35.4

The results show no satisfactory agreement with the results obtained either by vegetation experiments or by solubility in pepsin.

The relative solubility in pepsin-solution has this year agreed much more nearly with the relative availability as determined by vegetation tests, than has the relative solubility by putrefaction.

A further study of these methods is planned in the coming year.

FIRE-BLIGHT.

(*Micrococcus amylovorus*, Burr.)

By Wm. C. Sturgis.

For some years there has been prevalent in certain parts of the country, a bacterial disease affecting pear, apple, and quince trees, and known familiarly as "Fire-blight" or "Twig-blight." This serious disease early engaged the attention of specialists, and now its nature and course have been accurately determined, and a line of treatment recommended which promises good results.

For the past two years I have watched the gradual spread of this disease, and the time has come when it should receive the serious attention of Connecticut fruit-growers. It will be well therefore to consider briefly the nature of this disease, its contagious character, and the means which may be taken to check its ravages.

This disease has been known for the past hundred years, the first recorded paper upon the subject bearing the date 1794. At that time it was attributed to a borer, and for eighty years the theories advanced as to its cause were almost as numerous as were the observers. The two theories which received the most general acceptance were (1) that the disease was primarily due to the borer, *Scolytus Piri*, and (2) that it was due to winter freezing of the sap whereby a poison was engendered which destroyed the young shoots the following season. It was not until 1880 however, that any theory was advanced, based upon accurate scientific observation. In that year Prof. Burrill published the results of his investigations tending to prove that "fire-blight" was directly caused by a specific bacterial organism of minute size which he named *Micrococcus amylovorus* from its destructive effects upon the amylum or starch-contents of the cells attacked. The admirable work of Prof. Arthur in 1884 and subsequent years, has established this fact beyond doubt. Not only were the bacteria found in every case, filling the cells and exuding on the exterior of the parts affected, but the inoculation of sound trees with pure virus obtained from diseased trees resulted in the transfer of the disease in a virulent form. That the disease was due to the bacteria themselves and not to any soluble poisonous substances or ptomaines excreted by them, was abundantly proved by the fact that trees inoculated with the

liquid obtained by filtering a pure culture of the bacteria through a porous earthenware cell, and thus freeing it from the bacteria, failed to produce the disease; while trees inoculated with the unfiltered liquid still containing the bacteria, invariably showed abundant evidences of the disease in the course of a few days.

Trees liable to the disease.

In this neighborhood "fire-blight" is most commonly found upon pear trees, but it also attacks the apple and the quince, and may be mutually transferred by inoculation or by the natural means of infection. It has also been proved by Arthur that the common Service-berry (*Amelanchier Canadensis*), the English Hawthorn (*Crataegus Oxyacantha*) and the Evergreen Thorn (*C. Pyracantha*) are subject to the disease.

Appearance of the disease.

The first indication of "fire-blight" is seen in the blackening of the leaves of young shoots; when this symptom becomes manifest, the disease has already been in progress for two or three weeks. Later the twigs themselves become blackened and dead and in severe cases, especially in damp weather, there appears upon the surface of the affected parts a slimy film or exudation. Occasionally the disease makes its appearance on the larger branches of the trees, or even upon the trunk, when in outward appearance it suggests the physiological injury commonly known as "sun-burn" or "sun-scald." Finally it may in rare instances attack the fruit, producing upon the surface watery ulcers accompanied by a brown discoloration and decay. In all cases the disease is characterized by a more or less distinct putrefactive odor.

Mode of Infection.

The bacteria causing "fire-blight" are extremely minute, oval or rod-shaped organisms, occurring in vast numbers in the diseased tissues, and possessing to a slight degree the power of motion. When separated from the tissues, they may be grown in various liquids such as infusions of hay, starch, corn-meal, cooked pear, manure, or garden soil, or upon gelatine containing nutrient substances; in other words they may live and multiply indefinitely upon dead vegetable matter in the presence of moisture. This fact has an important bearing upon the spread of the disease.

The bacteria as they exude from the diseased tissues are washed down by the rain, or fall to the ground with the leaves and twigs containing them; upon the decomposing vegetable matter surrounding them they multiply with rapidity, and when dry are disseminated by the wind, or by currents of water. Borne by the air in spring time they find a lodgment upon the neighboring trees; on the moist surfaces of the delicate parts of the flowers and upon the growing, succulent tissues of the young twigs and leaves, they find favorable conditions for growth, soon enter the tissues, and in the course of a few weeks give external evidence of their presence in blackened leaves and shoots. According to Arthur and Waite the moist surface-tissues of the flowers and especially of the nectaries afford suitable conditions for the growth of the bacteria, which multiply in the nectar and are thence carried by insects from flower to flower and also to other trees. Waite is authority for the statement that an artificial epidemic of blight may be started by infecting a few trees on the edge of an orchard, and allowing free access of insects; and that protecting the flowers from visits of insects will protect from blight. This is only partially true as it leaves out of consideration agencies of infection other than insects. Very tender tissues and a moist atmosphere are the primary requisites for the inception of the disease, and when it makes its appearance on the branches or the trunk it may usually be traced to spurs at the base of the limbs, or to adventitious shoots arising upon the trunk in spring. The stings of insects, open wounds whether caused accidentally or by the pruning knife, and in fact any injury which exposes the tender, growing tissues, may admit the germs and thereby indirectly cause the disease.

From the foregoing facts we may arrive at some conclusions which will be of value in considering practical methods of treatment.

(1) Inasmuch as moisture and tissues in process of active growth are conditions peculiarly favorable to the development of the bacteria, we should look for the first symptoms of the disease in the spring, and especially in damp weather.

(2) We are justified in concluding that anything which tends to force excessive growth, or the development of tender shoots upon the limbs or trunk, tends equally to the inception of the disease.

(3) That open wounds of any description whereby the delicate tissues are exposed may give access to the germs of disease.

(4) That the disease will spread outward from the locality first infected, in the direction of the prevailing winds.

(5) That varieties making slow growth, and characterized by density of the tissues will be least susceptible to the disease.

(6) That the disease is mutually communicable between the pear, apple, quince, and hawthorn.

Means of Prevention.

It is evident that in the case of "fire-blight" fungicides will be of less value than with other fungous diseases. The organisms producing the disease are so minute, they occur in such enormous numbers, and gain access to the plant through tissues either so slightly exposed as to render it impracticable to reach them with a spray, or so delicate as to be susceptible to injury from any fungicide used, that we must look to other means of prevention or eradication.

Careful examination of the orchard from time to time during the spring, and in early summer two or three weeks after the opening of the flowers, will enable anyone to recognize the first visible symptoms of the disease in the blackened leaves of the young shoots. If such shoots are at once removed by cutting them off at least six inches below the lowest point where the disease is manifest, much will have been done to prevent its recurrence. It is hardly necessary to say that it is essential to do this work early and thoroughly, even if by so doing the greater part of the new growth is destroyed; and also that the diseased shoots should be burned to ashes at once. After the middle of July there is but little danger of the active spread of the disease from one tree to another since the bacteria are then within the tissues enclosed by the bark, or if they appear externally are held together by the gummy exudation; and furthermore at that season there are but few points where the surface-tissue is sufficiently tender to allow of penetration on the part of the bacteria.

Vigorous pruning then, and the burning of all diseased parts, is the surest means of eradicating the disease when once it has gained a foothold. To prevent a second attack through the tissues exposed by pruning, the wound should be at once sealed up either with grafting wax, or better still with oil shellac to which is added a little flowers of sulphur and a few drops of carbolic acid. This forms a more or less viscous liquid and can be readily applied with a paint brush.

Secondly, care should be taken, especially in the case of trees which tend to grow rapidly and to develop soft, watery shoots, not to force growth in the spring by the application of fertilizers in

unusual quantities. The continuous and regular application of fertilizing materials to land already enriched will tend to produce a slow but continuous growth, and the young shoots will ripen as they develop. Such fertilizers as wood ashes and ground bone are to be recommended for inducing the maturing of the wood.

Those who desire more detailed information regarding the nature of "fire-blight" are referred to the original publications of Burrill and Arthur.*

Prevalence of "Fire-blight" in Connecticut.

From my own observations and from information received from others it would seem that "fire-blight" is not as yet very widely spread throughout the State. It has been reported as causing slight damage to pears and quinces at Bristol, Hartford Co.; it has done considerable damage to pears, and is on the increase, in the neighborhood of Meriden; during the past season it was very prevalent upon pears, apples, and quinces near Berlin, though not previously reported from that locality; and it attacked quinces here and there in the vicinity of New Haven. It is doubtless far more widely spread than would appear from the reports received, since it has not yet been generally recognized by the farmers of the State as a distinct and specific disease.

A "FIRE-BLIGHT" OF PLUM TREES.

By Wm. C. Sturgis.

About the middle of July last it was reported that a blight had attacked a large orchard of plum trees at East Hartford, and upon visiting the orchard I was at once struck by the resemblance of the blighted trees to pear trees affected with "fire-blight." The orchard occupied comparatively high, well-drained land, the soil was sandy, very light, and at that time extremely dry. The trees were three-year old stock of the Spaulding and Abundance varieties. The disease had attacked only the former variety, but had done great injury to the young wood. The young shoots

* Burrill, T. J., Proc. Amer. Assoc. Adv. Sci., Vol. xxix, 1880, p. 583. Trans. Ill. Hort. Soc., 1883, p. 46.

Arthur, J. C. Rep. N. Y. Agr. Exp. Sta. for 1884, p. 357; Ibid, 1885, p. 241; Ibid, 1886 ,p. 275 (to which is appended a complete bibliography of the subject to date) Proc. Phila. Acad. Nat. Sci., 1886, p. 322.

and leaves were black, and bent over as though wilted. The leaves were dry and crisp, the twigs themselves flexible and somewhat of the consistency of soft sealing-wax. The blight had evidently started at the extreme tips of the twigs and had extended downwards a distance of from six to ten inches. In this case infection must have taken place through the young leaves, as no flowers had been produced. A number of the diseased twigs were collected for microscopic examination, and directions were given that all the affected tips should be removed and burned. On Aug. 2d I wrote asking for more samples of the disease from the same orchard, but was informed that the disease had not reappeared upon either variety and that all of the trees appeared to be healthy. Meantime specimens examined in the laboratory showed unmistakably the presence of bacteria in the diseased tissues, and there was also upon the leaves a species of Cladosporium, though this latter was apparently a common saprophytic fungus in no way connected with the disease. Specimens were sent to Prof. Arthur who kindly examined them and wrote as follows: "The appearance of the twigs is certainly that of pear blight, but I have never seen genuine pear blight attacking any of the stone fruits. I do not have any difficulty in finding the bacteria in quantity in the diseased tissues. I should say that the disease is likely to be bacterial in its nature, but not to be identical with pear blight."

Attempts to secure pure cultures of the bacteria proved unavailing, and a like result attended all efforts to inoculate pear, apple, and quince trees with virus from the plum twigs. Lack of material prevented further study of the disease. Meanwhile it is well to note the presence of this disease which, if permitted to run its course unchecked, is capable of doing very serious injury to plum stock.

EXPERIMENTS ON THE PREVENTION OF POTATO SCAB.

By Wm. C. Sturgis.

The use of corrosive sublimate in the treatment of potato scab was first suggested as the result of definite experiments, by Prof. Bolley in 1891.* The success attending those experiments led to

* N. Dak. Agr. Exp. Sta., Bull. 4, Dec. 1891.

others in various localities East and West, of which the most conclusive were those conducted by the Rhode Island* and Michigan† Stations in 1893.

Since these and other publications upon the subject are not readily accessible to the majority of farmers, it was thought advisable to repeat the experiment in a locality and upon a scale which would enable Connecticut farmers to judge for themselves regarding the value of the treatment. For this purpose a piece of land was secured through the coöperation of Mr. W. H. Olcott of South Manchester. The land adjoined Mr. Olcott's farm and measured about three-quarters of an acre; it was old meadow which had not been cultivated for many years and had probably never borne potatoes. A slight slope toward the west insured good drainage, and the soil was a sandy or gravelly loam. The rows were laid out east and west across the lot, and were, on an average, 126 feet in length. The land was prepared by ploughing and turning the sods under, harrowing, and lining out with the plough.

The course of treatment was as given by Prof. Bolley, as follows:

"Dissolve corrosive sublimate (bichloride of mercury) in water at the rate of two and one-fourth ounces of the chemical to fifteen gallons of water. Immerse all potatoes to be used for seed purposes in this solution one and one-half hours, after which they may be cut and planted as usual.

NOTES: Corrosive sublimate is a strong poison; great care should be taken that none of it is taken into the stomach.

To insure rapid solution, all the chemical may conveniently be dissolved in a few gallons of hot water.

This chemical corrodes metallic substances and should therefore be mixed in wooden vessels.

A large barrel or hogshead will be found a convenient vessel in which to dip the potatoes.

A loosely woven sack (coffee-sack), will be found suitable for the dipping purposes.

If the potatoes are very dirty it will be found expedient to wash them before treatment.

After dipping spread the potatoes about so that they will dry quickly."

The seed used for planting was of three grades, (1) very scabby, the tubers being completely covered with the scab spots and quite unmarketable; (2) fairly scabby, showing a decided amount of scab but still marketable at low prices; (3) clean,

* R. I. Agr. Exp. Sta., Bull. 26, 1893.

† Mich. Agr. Exp. Sta., Bull. 108, 1894.

either completely free from any trace of scab, or exhibiting only small, isolated points of infection.

The seed was planted May 19th, 20th, and 21st; a month later the plants were making a good growth. The points upon which information was particularly desired were, (1) the effect upon the crop of the use of clean seed as compared with scabby seed, all other conditions being the same; (2) the effect of the use of barnyard manure as compared with commercial fertilizer; (3) the effect of treating the seed before planting, with corrosive sublimate, as compared with the product from seed not treated, the plants in both cases being raised on barnyard manure; and (4) the same, with the exception that the plants were raised on commercial fertilizer. No account was taken in the experiment of the varieties of seed used. It was selected solely with regard to its scabbiness or its freedom from scab, but the greater part consisted of New Queen, with some Early and Late Rose.

The land was divided into eight plots, separated by blank rows or by rows planted with clean seed and not considered in formulating the results.

The accompanying table shows for each plot the character of the seed, whether clean or scabby; the variety; the number of rows in the plot; the fertilizer used; the treatment or non-treatment of the seed with corrosive sublimate; the yield of two average rows from each plot; and the character of the crop. It will be seen that the experiment illustrates several minor points as well as those which were primarily important. The utmost care was exercised in grading the product. Every tuber was freed from dirt as thoroughly as was possible without washing, and carefully examined. If it showed the scab in quantity sufficient to render it practically unmarketable, it was classed as Grade 3; if slightly scabby, but marketable, or such as might generally be used as seed, it was classed as Grade 2; Grade 1 included only such tubers as showed, after careful examination, not the slightest trace of scab. Each grade in each plot was kept separate, measured, weighed, and photographed.

About the middle of July the tops were attacked by "early blight" (*Macrosporium Solani*, E. & M. ?), and they also suffered somewhat from sunburn, the weather being excessively hot and dry, and from the depredations of flea-beetles, but the damage was not sufficient to vitiate the results.

The potatoes were dug Sept. 25th and 26th, and, as has been said, two sample rows were taken from each plot for comparison.

Referring now to the table, a comparison between plots B^2 and D illustrates the result of planting clean seed as compared with scabby seed, there being no treatment in either case with corrosive sublimate. The character of the crop as regards the amount of scab shows surprisingly little difference, the difference, however, being in favor of the clean seed. Very similar results obtain in a comparison between the effects produced by planting clean seed and scabby seed, both being treated before planting with corrosive sublimate. Thus a comparison between plots B^1 and C shows that the clean seed treated produced only 7% more clean tubers than the scabby seed treated. The scabby seed produced 6% more tubers which were fairly scabby, and the percentage of very scabby tubers was in both cases the same. Undoubtedly, as will be seen later, the large amount of scab present on all four plots B^1, B^2, C, and D, was due to the presence of the barnyard manure, and we may conclude, so far as a single experiment may be taken as an indication, that the treatment with corrosive sublimate avails but little in the presence of barnyard manure. It should be stated that in all cases where barnyard manure was used, the seed was planted in direct contact with the manure both above and below, thus giving to the germs of the scab fungus presumably resident in the manure, the most favorable opportunity for attacking the tubers. We must also bear in mind in forming our conclusions that whereas all barnyard manures form a medium favorable to the growth of the scab fungus, there may be a very marked difference in the amount of the fungus present, a difference depending upon the season at which the manure is made and stored, the substances which have entered into its composition, and its liability to infection from diseased potatoes fed to stock or from the refuse of a diseased crop.

We may obtain more trustworthy data regarding the effect of barnyard manure on the amount of scab, as compared with commercial fertilizer, by contrasting plots A and B^2, the seed in neither case having been treated with corrosive sublimate. On both plots the crop shows the presence of scab, notwithstanding the fact that perfectly clean seed was used and that the land was presumably free from the scab fungus, but whereas the crop raised upon commercial fertilizer shows but 4% of very scabby tubers, one-third of the crop raised on barnyard manure is very scabby. A like difference is seen between the yield of fairly scabby and of clean tubers on the two plots. In this case cer-

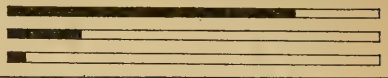
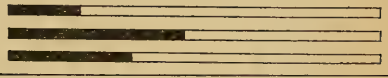
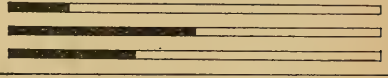
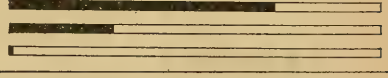
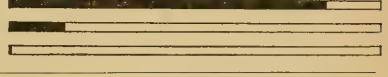
tainly the use of barnyard manure has very materially increased the amount of scab, even upon clean land and with clean seed. We may fairly conclude then, that the use of barnyard manure is decidedly conducive to scab.

We may go one step further and compare the effect of barnyard manure and of commercial fertilizer used in connection with scabby seed treated with corrosive sublimate. Plots C, H, and B^2 present figures for comparison upon this point. Plot C offers every opportunity for a large percentage of scab except that the seed has received a presumably preventive treatment. Leaving the treatment out of account, we should expect a far larger percentage of scab than in the case of plot B^2, for example, where clean seed was used. As a matter of fact however, the results show only half as large a percentage of very scabby tubers and 5% more of clean tubers. In the case of plot C then, the treatment has been of undoubted value in lessening the amount of scab even under conditions otherwise most favorable to its spread.

But that the treatment has not been able entirely to overcome the conditions induced by the presence of the barnyard manure, becomes evident upon a comparison of plots C and H. Upon plot H, the treatment of the seed with corrosive sublimate has produced from scabby seed upon commercial fertilizer, a crop practically free from very scabby tubers, and showing only 15% of tubers at all affected with scab. With this favorable showing, the 15% of tubers rendered unmarketable by scab on plot C, evidently the result of the manure, is in marked contrast. There is good reason to believe that had the seed upon plot H been clean, there would have been no trace of scab upon the crop.

We may conclude then, that while the effect of barnyard manure upon the spread of scab may be partially counteracted by treating the seed with corrosive sublimate before planting, the use of either manure or scabby seed tends to induce scab upon the tubers.

Finally, we may reach more definite conclusions upon the question of the value of corrosive sublimate as a preventive of scab, by a comparison between plots G or H, and F. On these three plots scabby seed was planted in connection with commercial fertilizer. The seed used upon plots G and H was treated with corrosive sublimate before planting; that upon plot F was not so treated, but was merely washed clean with water. Here the beneficial effect of the treatment is very evident. Plot F shows 13%

Plot.	Quality of Seed.	Variety of Seed.	Fertilizer.	Treatment of Seed.	Total yield in pounds from two sample rows.	Quality of Crop.*	Percentages of Grades 1, 2, and 3 represented graphically.
A.	Clean.	Early Rose and Late Rose.	Commercial.	0	148¼	1. 114 lbs. = 77 per cent. 2. 28¼ " = 19 " 3. 6 " = 4 "	
B¹.	Clean.	Late Rose.	Barnyard Manure.	Corrosive sublimate.	176¼	1. 55 lbs. = 31 per cent. 2. 94 " = 54 " 3. 27¼ " = 15 "	
B².	Clean.	Early Rose.	Barnyard Manure.	0	132	1. 25 lbs. = 19 per cent. 2. 62½ " = 47 " 3. 44½ " = 33 "	
C.	Scabby.	New Queen.	Barnyard Manure.	Corrosive sublimate.	144	1. 34 lbs. = 24 per cent. 2. 87½ " = 60 " 3. 22½ " = 15 "	
D.	Scabby.	New Queen.	Barnyard Manure.	0	110½	1. 17 lbs. = 16 per cent. 2. 56½ " = 50 " 3. 37 " = 34 "	
F.	Scabby.	New Queen.	Commercial.	0 Washed.	97	1. 35 lbs. = 36 per cent. 2. 49 " = 50 " 3. 13 " = 13 "	
G.	Very Scabby.	New Queen.	Commercial.	Corrosive sublimate.	148¾	1. 105 lbs. = 71 per cent. 2. 41½ " = 28 " 3. 2¼ " = 1 "	
H.	Scabby.	New Queen.	Commercial.	Corrosive sublimate.	163⅜	1. 139 lbs. = 85 per cent. 2. 24 " = 15 " 3. 6 oz. = —1 "	

* Graded according to amount of scab on tubers: 1 = 1st quality, with no trace of scab. 2 = 2nd quality, fairly scabby but marketable. 3 = 3rd quality, very scabby, unmarketable.

For effect of scabby seed, compare plots B² and D (not treated), Or plots B¹ and C (treated.)
For effect of manure, compare plots A and B² (clean seed), Or plots C and H (scabby seed.)
For effect of treatment, compare plots B¹ and B² (manure), Or plots G or H and F (commercial fertilizer.)

of very scabby tubers as compared with 1% from plot G, and only one tuber from plot H, while the percentage of clean tubers from plot F is only half as large as that from plot G. Plot F shows 63% of scabby tubers, plot G 29%, and plot H only 15%. The difference between plots G and H is to be attributed to the seed; on plot H fairly scabby seed was used, while for plot G pains were taken to secure seed so thoroughly infested that there was not a spot half an inch square which was free from scab. That under such circumstances only 1% of the tubers proved to be as scabby as the seed planted, is a fact which strikingly attests the value of the treatment. Plots B^1 and B^2 illustrate the same point though in a less marked degree, owing to the fact that the crop was contaminated by barnyard manure. Even in this case however, there are but half as many very scabby tubers from the treated seed as from the untreated, and 12% more of clean tubers.

We are now in a position to sum up our conclusions from this experiment.

(1) The character of the seed as regards scab, has much to do with the character of the crop. As a rule scabby seed will produce a scabby crop, other things being equal; and the amount of scab on the crop will be directly proportional to the amount of scab on the seed.

(2) In the presence of barnyard manure the tubers tend to become scabby to a degree not markedly affected by the character of the seed, whether clean or scabby.

(3) Treating the seed with corrosive sublimate before planting, avails to some extent in preventing scab when barnyard manure is used, though the amount of scab present under such circumstances may vary with the character and composition of the manure. Further experiments may compel a modification of this conclusion.

(4) The use of commercial fertilizer is not a preventive of scab, but when clean seed is planted on clean land the amount of scab is far less with commercial fertilizer than with barnyard manure. The same is true in a lesser degree when scabby seed is used.

(5) Treating scabby seed with corrosive sublimate before planting tends to decrease the amount of scab upon the tubers even in the presence of barnyard manure.

(6) The treatment of scabby seed with corrosive sublimate before planting, may produce a practically clean crop if commercial fertilizer be used, and the land be clean. Clean seed under like conditions will certainly do so.

Results obtained on the Farm of Mr. Bidwell.

It will be of interest to note certain results attending the use of corrosive sublimate in the treatment of seed potatoes on the

farm of Mr. Dwight Bidwell of South Manchester. In this case the experiment was conducted without our assistance and for the purpose of securing as clean a crop as possible, rather than of affording a distinct proof of the value of the treatment. The results therefore are merely indicative and present no means of comparison between the product from seed treated and that from seed not treated.

Field No. 1 consisted partly of reclaimed swamp land and partly of a sandy loam; it had not previously borne potatoes and hence was presumably free from scab. It was heavily fertilized with stable manure and tobacco stems, thoroughly worked in. The seed was treated with corrosive sublimate, and produced a practically clean crop. In this instance the treatment seems to have prevented infection from the manure.

Field No. 2 comprised an underdrained swamp occupying about one-half of its area, the remainder being a dry sandy or gravelly knoll. During the summer of 1893 it had borne a crop of scabby potatoes. It was fertilized with stable manure and tobacco stems. The seed was treated with corrosive sublimate, but a portion of it failing to come up, that part was replanted with seed which received no treatment. The crop showed 75% of scabby tubers. In this case the land was undoubtedly thoroughly infested with scab, and a comparison of the results with those obtained on field No. 1, would lead to the impression, though definite proof is wanting, that the scabby quality of the crop was due primarily to the infested soil accentuated by the fact that the seed used in replanting received no preventive treatment. At least we may fairly conclude that the use of land known to be infested with the scab fungus from a former crop, is to be avoided.

Field No. 3 consisted of turf land, ploughed under and harrowed. It received commercial fertilizer sown between the drills at the rate of 1200 pounds per acre. The seed was treated, but it became necessary to replant a portion of the field, and for this purpose seed was used which was slightly scabby and received no treatment. The crop from this field showed from 15% to 20% of scabby tubers. In this case it seems probable that the loss was occasioned by the use of the scabby seed.

From these facts it is evident that in order to avoid scab we must observe certain precautions.

Select if possible, clean land, that is land which has not previously borne a scabby crop of potatoes, beets, or turnips.

Select only the cleanest seed for planting.

Avoid the use of barnyard manure on potatoes if practicable.

In any case, and especially if scabby seed or barnyard manure must be used, treat the seed with corrosive sublimate before planting, according to the directions given on p. 119.

Corrosive sublimate may be bought at any apothecary's for 10 to 12 cents per ounce, three ounces will be sufficient to treat enough seed to plant five acres or more. The labor of preparing the solution and treating the seed is very slight, the potatoes require no further treatment for scab during their period of growth, and the treatment involves no expense in the way of apparatus.

In view of these facts there is no reason why this treatment against potato scab should not be universally adopted by growers of potatoes, and the percentage of scabby tubers in our markets and cellars be reduced to a minimum.

The experiment conducted this year will be continued another season with the view of confirming the facts already ascertained, and of securing more information upon other cognate questions of importance.

SCAB UPON TURNIPS.

By Wm. C. Sturgis.

A form of scab proved to be identical with that occurring upon potatoes has been recorded by Bolley, upon beets.* "With the beet it does not as a rule result in cavities, but the corky formations are very extensive. It has its inception at the points where the pith rays touch the surface. It is at these points that the rootlets arise from the beet, hence the scabs injure many points on the surface that might else be occupied by the fine roots that supply nourishment. In the past few days Swedish turnips, carrots, and cabbage roots have been procured in the market, all apparently affected with the same disease. It is quite a common appearance on the turnips and I have little doubt of its identity."

During the month of November specimens of turnips were sent to the Station from South Manchester, bearing numerous scabs as seen in the accompanying illustration, Plate IX. These turnips were grown upon land which for the two years preceding the planting of the turnips, had borne potatoes, and I am informed that the potatoes were more or less scabby.

* N. Dak. Agr. Exp. Sta. Bull. 4, p. 15, with plate, Dec. 1891.

PLATE VIII. Fir Twigs injured by Fir Mite.

PLATE IX. Scab on Turnips.

The attention of farmers is therefore called to the fact that the scab of potatoes is communicable to turnips, beets, and possibly to other root-crops, and that it is unsafe to plant such a crop upon land known to contain the germs of the scab-fungus.

The treatment of turnips for scab presents difficulties of which there is at present no solution. Care in the selection of the land, the use of commercial fertilizers, and rotation with other than root-crops are precautionary measures which may be recommended.

NOTES ON THE "EARLY BLIGHT" OF POTATOES.

By Wm. C. Sturgis.

Public attention was first called to this disease by Humphrey, who in the Annual Report of the Mass. Agr. Exp. Station for 1891, reported its occurrence on potatoes in the neighborhood of Hadley, Mass. He also records "the constant presence in the diseased spots of mycelium, from which were developed, on the lower surface of the leaves, spore-threads and spores of the form-genus *Macrosporium*."

Almost simultaneously with the publication of this report, Jones reported a similar disease from Vermont,† and Chester noted it in Delaware.‡ The former recorded no fungus as associated with the disease, and suggested that it might be identical with a bacterial blight of potatoes first described by Burrill.§ He furthermore stated with regard to spraying, that but little if any benefit was derived from the use of Bordeaux mixture and other fungicides. Chester, on the other hand, found a species of *Macrosporium* associated with the disease, and identified it with *M. Solani*, E. & M., which occurs also upon the tomato and "Jimson weed" (*Datura Stramonium*), and he has further recorded the results of inoculations proving that the fungus is a true parasite and can be artificially transferred from the potato to the tomato. He quotes Galloway as recommending from experience the use of Bordeaux mixture in checking the trouble.

But that the diagnosis of this peculiar disease is not yet complete, is shown by the later observations of Jones. As the result of the examination of a number of diseased potato leaves, he

* Vt. Agr. Exp. Sta., Rep. for 1892, p. 67.

† Vt. Agr. Exp. Sta., Rep. for 1891, p. 131. Also Bull. 28, p. 25, Apr. '92.

‡ Del. Agr. Exp. Sta., Rep. for 1891, p. 58. Also Bull. xv, p. 13, Jan. '92.

§ Proc. 11th An. Meet., Soc. Prom. Agr. Sci. 1890, p. 21.

states,* "We are still in some doubt as to the cause of part of this trouble, and do not think that any one thing is wholly responsible. In many leaves examined we were unable to find any trace of fungous attack. In the large majority however, we found a *Macrosporium*, apparently *M. Solani*, E. & M. The general association of this fungus with the disease, leaves little doubt in our minds that it was a cause of a large part of the trouble last summer." Regarding treatment for the disease, he states that "in so far as this early blight is caused by the attacks of the *Macrosporium*, we may hope to hold it in check by spraying," and he recommends Bordeaux mixture for this purpose.

Finally Galloway states,* "For blight (*Phytophthora*) and the *Macrosporium* disease nothing so effective as the Bordeaux mixture has been found."

This evidence as well as our own experience leads us to ask whether the so-called "early blight" of potatoes is always directly traceable to fungous attack; and if not, whether Bordeaux mixture is of much practical value in treating vines which, while evidently blighted, show no trace of the *Macrosporium*. Observations made last year, and commented upon briefly in our Report for 1893, failed to show any trace of fungi in the majority of diseased leaves examined, yet the gross appearance of the leaves was exactly that described by Jones and Chester in the case of "early blight,"—small dead spots, dry and brittle in texture, usually appearing first at the tips and edges of the leaflets, and marked with dark, concentric rings; spreading slowly, especially in very hot weather; usually originating at the edges of the eroded pits caused by the flea-beetle, (*Crepidodera* sp.).

During the season just past, the weather from the early part of June to the middle of July was extremely dry, a burning sun was frequently accompanied by high winds, and potatoes suffered severely. A large number of specimens of blighted leaves were obtained by correspondence and otherwise, and were carefully examined for the *Macrosporium*. The majority of specimens showed no trace of any fungus in the tissues; in a few instances the *Macrosporium* was found in small quantities, and in one case there was an abundance of a species of *Cladosporium* occupying the blighted areas, but evidently existing saprophytically on tissues destroyed by some other agency. Traces of the flea-beetle were abundant in all of the specimens examined.

* U. S. Dept. Agr., Farmer's Bull. No. 15, 1894, p. 6.

In view of such conflicting evidence, a few additional facts may be of interest.

We have seen that the blight has accompanied in every case reported, injuries induced by the flea-beetle, and so far as I am aware, there have been no instances of early blight as a specific disease attacking sound leaves to any marked degree. It is well known that the attacks of the flea-beetle are most severe in dry, hot weather, under which conditions the early blight seems also to prevail. Opinions differ regarding the value of Bordeaux mixture, some observers claiming that it is but slightly, if at all, effective against the trouble, others that in so far as it is caused by a fungus there is a possibility of holding it in check by spraying with Bordeaux mixture, while others again state that for blight (*Phytophthora*) and the *Macrosporium* disease nothing so effective as the Bordeaux mixture has been found. It is significant however, that there are no published reports giving distinct and accurate comparative results of experiments in the treatment of the "early blight" as a specific disease. The results in this direction have been as a rule obtained incidentally in the course of experiments designed to test the value of fungicides in the treatment of the mildew or rot (*Phytophthora infestans*).

Under date of July 11, 1894, an extensive grower of potatoes and manufacturer of fertilizers in Pittsburg, Pa., wrote me to the following effect. "For about six weeks there has been almost no rain; the weather has been very close, and sun hot. Under these conditions many potato fields have been wholly destroyed, those on sandy soil suffering most." My correspondent sprayed his potato vines during the drought with Bordeaux mixture, and "cultivated" frequently, a process frequently practiced and of great assistance in increasing the capacity of the soil for retaining moisture in dry weather; his vines made vigorous growth and held up throughout the drought, while those belonging to a neighbor, which were sprayed, but received no unusual cultivation, were a complete loss.

Specimens of blighted leaves received from this gentleman showed that the flea-beetle had been abundant, and on some of the specimens there were traces of *Macrosporium*. These facts seem to add probability to the theory that extreme heat and dryness, accentuated by lack of moisture in the soil, may induce the death of tissues at a distance from the roots (the tips and edges of leaflets); that this damage may be increased and even

initiated by the attacks of predatory insects (flea-beetles) which partially destroy the tissues at certain points; and that finally in some cases a facultative parasite (a fungus which exists normally as a saprophyte upon dead tissues, but may under certain conditions attack living tissues and thus become a parasite) such as species of the genera *Macrosporium*, *Cladosporium*, etc., may attack the dead or dying tissue, and aggravate the trouble, while in other cases no such fungus attack is observable.

Such a theory seems to be in accordance with the facts observed —the appearance of "early blight" at a season usually marked by dry, hot weather; its prevalence during the extremely dry summers of the past two years; its slow progress, in marked contrast to most fungous diseases of the nature of blight, rot, etc.; the advantage gained by frequent shallow tillage, preventing the rapid evaporation of moisture from the soil; and finally the fact that in the majority of cases the injury from "early blight" is directly proportional to the damage done by the flea-beetle. There are two facts however, which, if established, would go far to prove the fungous character of "early blight." These facts are, (1) the value of a well-known fungicide in checking the trouble, and (2) the fact reported by Chester that sound potato leaves inoculated with *Macrosporium* spores exhibit in the course of a few days symptoms of the "early blight."

As regards the value of Bordeaux mixture in this case, it has already been noted that testimony upon this point is not unanimous, and various reasons may be assigned to account for its apparent efficacy. It is well known that the use of Bordeaux mixture, or in fact of any compound of copper, tends to increase the vigor of potato plants to a very marked degree, apart from any fungicidal action which it exercises. It is not improbable that the beneficial effect arising from its use in certain cases of "early blight," may have been in a measure due to this tonic action. Again, if the *Macrosporium* may become a parasite under certain conditions, just so far as those conditions prevail Bordeaux mixture would doubtless act as a preventive of the initial attack upon tissues injured by insects. Finally, upon the theory outlined above, any agency which would tend to check the ravages of the insects would equally limit the spread of the blight. Bordeaux mixture is not usually regarded as of much value as an insecticide, but the careful investigations recently conducted by Jones* prove that Bordeaux mixture acts as a

* Vt. Agr. Exp. Station, Rep. for 1893, p. 50.

deterrent against flea-beetles, and in this fact a reason may be found for the benefit arising from the use of the mixture in the case of "early blight."

A few sentences from a recent address by Prof. Jones* have a direct bearing upon this subject. "Leaves thus mutilated (by the flea-beetle) are most disastrously exposed to the effects of drought during dry weather, and to the inroads of fungi during wet weather. Indeed these secondary injuries follow so closely after the attacks of the flea-beetle, that the majority of potato growers attribute the entire trouble to these secondary agencies."

We may now consider the second fact in favor of the parasitic nature of "early blight," viz: the susceptibility of potato leaves to inoculation with *Macrosporium* spores, as reported by Chester.

If these experiments are verified, there can be no doubt but that *Macrosporium Solani* is a true parasite capable of attacking sound leaves of the potato and tomato, and inducing in them symptoms of serious disease. Upon this point I will quote a letter received from Prof. Chester, under date of July 27th, 1894: "At the outset I was myself sceptical of *Macrosporium Solani* as the immediate and active cause of the trouble, and I am still inclined to regard the fungus as perhaps a facultative parasite, capable of assuming the role of a (true) parasite only under certain conditions unfavorable to the plant. In my examinations of diseased leaves I have so far always been able to find the *Macrosporium*, although I have quite invariably found the sporophores sparsely distributed and the spores correspondingly few. This has defeated my efforts to get the fungus in artificial cultures. My efforts at inoculation had therefore to be made by placing upon healthy potato leaves, upon plants growing in the glass house, small bits of the diseased leaves, which microscopic examination showed contained the spores of *Macrosporium*. In this way I brought the spores into direct contact with healthy, growing leaves, in the presence of sufficient moisture to favor their germination. Thus I succeeded in the majority of cases in infecting both potato and tomato leaves, causing the black spots which afterwards developed a fruiting of the fungus more abundantly than was the case in nature. Whether the moisture and shading of an area on the growing leaf effected by the bit of dead leaf placed thereon, may not at the outset have etiolated the leaf at this point sufficiently to have given the fungus just

† Agricultural Science, Vol. viii, p. 364.

the needed advantage, is a question which I did not attempt to answer. However, I felt convinced at the time that the fungus spoken of was either directly or indirectly an agent in the production of the trouble. It is quite possible that the trouble is partly physiological, partly parasitic, and it is furthermore quite possible that the *Macrosporium* in question is a facultative parasite, and not a true parasite as I at first assumed. Until we can get this fungus in pure cultures on artificial media so as to have an abundance of pure material for inoculation, we cannot expect to solve the questions under discussion."

It will be readily seen that these experiments do not furnish absolute proof. Pure cultures were not obtained, and there was therefore no positive proof that the *Macrosporium* was the immediate cause of the trouble induced in the leaves; the leaves themselves were subjected to conditions seldom obtaining out of doors; and the conditions of moisture were far more favorable to fungus growth than those observed in the field when the "early blight" is most severe. In fact the atmospheric conditions coincident with the appearance of "early blight" as thus far observed, are not generally conducive to fungus growth.*

Finally, through the kindness of Prof. Jones, I was enabled to examine a number of specimens of "early blight," and to compare them with specimens obtained by myself. In these specimens a somewhat similar appearance had apparently been caused by two distinct agencies, one of which might possibly be of a physiological nature. The other might as possibly be fungous, since upon many of the leaves examined, the *Macrosporium* was evident under the microscope. Both classes of injury appeared in connection with the marks of the flea-beetle, both were exhibited as brown spots and blotches marked with concentric rings; but in the specimens characterized by the presence of the fungus the spots were more sharply defined and darker in color. This difference was sufficiently marked to enable a close observer to distinguish either one in the field after a little practice, but a comparison between the two produced the impression that both classes of injury might have been originally caused by the same agency, and that the slight difference in appearance might be due to the fact that in the one case a fungus had occupied the injured tissue, and in the other had not done so. To sum up then, the essential points of this theory: It seems possible that the "early

* See additional note on the "early blight" of potatoes, p. 133.

blight" of potatoes may be due to the physiological effects of extreme heat and dryness acting upon leaf tissues at a distance from the roots, and already injured by predatory insects, especially those abundant under such atmospheric conditions; that anything which will check the ravages of the insects will in a measure check the blight; and that tissues so injured are liable to the attacks of certain fungi which may enhance the injury.

Whatever the value of this theory, the facts in the case warrant certain recommendations regarding the treatment of potatoes.

(1) Cultivate the surface soil to a little depth frequently and thoroughly especially in seasons of extreme heat and drought.

(2) Treat the vines, beginning earlier than usual, with strong Bordeaux mixture (6 lbs. copper sulphate, 4 lbs. lime, 22 galls. water), or with Bordeaux mixture to every 10 galls. of which is added 1 lb. of soap dissolved in hot water; either mixture acts as a deterrent against the flea-beetle.* When the potato-bug appears, add Paris green to the mixture at the rate of ½ lb. to 50 gallons.

(3) Prof. Jones recommends late planting in order to escape the injuries of "early blight." "Early potatoes form their tubers largely during the dryer weather of July, then, weakened by this effort, they succumb readily to the combined effects of dry weather, insect attacks, and the early-blight fungus." This practice is to be emphasized in case growers are prepared to treat their vines for the late blight or rot, which is especially liable to attack late potatoes.

ADDITIONAL NOTE ON THE "EARLY BLIGHT" OF POTATOES.

Since the above was written there has been published by Prof. Sorauer,† one of the most able vegetable pathologists of Europe, an article which bears so directly upon the subject in hand that I may be pardoned for quoting from it somewhat at length. The article deals with a tendency which the author finds among investigators to attribute true parasitism to many fungi which are found associated with disease, and to conclude from insufficient data that in such cases the fungus is the primary cause of the diseased condition. Such conclusions are usually based upon inoculation experiments, and in this connection Prof. Sorauer writes as follows: "No doubt the greater number of such observations are correct, since as a rule inoculation experiments show that such fungi as those to which our common moulds

* Vt. Agr. Exp. Sta., Rep. for 1893, p. 50.

† Zeitschrift für Pflanzenkrankheiten. Bd. IV, Heft 6, p. 325.

belong, are able to destroy an organ completely. But this evidence remains incomplete and the designation of such fungi simply as parasites is uncertain and confusing, until experimental proof is obtained that *the fungus is able to induce disease in a sound organ still retaining its normal function upon the organism;* and this proof is rarely forthcoming. I am convinced that we should make greater advances in our knowledge of diseases if we would regard parasites less as exclusive causes of disease, and more as diagnostic means for the recognition of an unhealthy condition. The determination and the study of the parasite is of value as a hint as to the direction in which the organism is functionally weak, and our attempts at remedial treatment will no longer be directed merely locally at the diseased organ, but toward a change in the economy of the organism as a whole. In many instances the observer fails to consider the question whether the infected organ may not already have been brought by separation from the organism or by being kept for some time in a damp atmosphere deficient in light, into an enfeebled condition which is the sole cause of its susceptibility. It is often possible in the inoculation of delicate tissues to induce disease in damp weather merely by closely covering the infected area on a sound leaf not detached from the plant, with a portion of another leaf, while the portion not so covered remains sound. In other cases it may be proved by experiments that two seedlings of the same species, and even two shoots on the same plant behave quite differently toward parasites, if one of them be enfeebled by excess of heat in a greenhouse, while the other is allowed to grow normally in the open air. Recent experiments show that in the case of plants which require water, excessive dryness increases their susceptibility to fungus attack."

Upon these grounds Prof. Sorauer concludes that a distinction should be made between strictly obligate parasitism and cases in which the fungus can gain a foothold only upon an injured surface, and he suggests a separation of parasitic fungi into three classes: (1) absolute parasites, attacking uninjured, healthy organs; (2) partial parasites, attacking uninjured but unhealthy organs; and (3) wound-parasites, attacking injured organs at the point of injury.

The facts elucidated in connection with the fungus associated with "early blight" would seem to justify us in including it in the second or possibly the third class, instead of in the first class as heretofore.

EXPERIMENTS ON THE TREATMENT OF PEAR-SCAB.

(*Fusicladium pirinum*, (Lib.) Fckl.)

By Wm. C. Sturgis.

The experiments of the past two years in the orchard of Mr. A. E. Plant, of Branford, were continued during the summer of 1894. As in previous years, the experiment was designed mainly to test the value of the winter treatment alone, consisting of a simple solution of copper sulphate at the rate of 1 lb. to 25 galls. of water, as compared with the same treatment enforced by treatment during the summer with Bordeaux mixture. The winter treatment was applied thoroughly on March 31st, before the buds had begun to swell appreciably, and of the trees so treated a portion received no further treatment while the remainder were sprayed with Bordeaux mixture three times, on May 4th and 17th, and June 6th. A third block of trees was reserved as a check and received no treatment of any kind. For convenience of reference we here designate the separate plots and the treatment received by each.

Plot A, received winter treatment only.

Plot B, received winter and summer treatment.

Plot C, received no treatment. (Reserved as a check.)

Plot D, received winter and summer treatment.

Plot E, received summer treatment only.

At the time of harvesting, Mr. Plant made careful notes upon the general appearance of the trees, and the extent to which "scab" prevailed upon both leaves and fruit; the following points are based upon these notes :

In plot A, the fruit was considerably spotted by "scab," especially the Lawrence variety, most of which was unfit for use. The foliage however, was retained well.

In plot B, the fruit was very little affected by the "scab," and the leaves held on well. Regarding this plot Mr. Plant writes: "The plot comprises several Lawrence trees the fruit of which has been in previous years a total loss. If we can overcome the "scab" next year in the same proportion as we did this year, then, if the trees bear, we can sell some fruit." There is no doubt but that a fourth treatment should have been given late in June or early in July. The prolonged drought of June was broken July 22d, and frequent showers ensued accompanied by much warm,

damp weather. At this time there were but slight traces of the Bordeaux mixture remaining upon the trees from the spraying of June 6th, and the small amount of "scab" upon the trees of plot B developed after the rains began. This might have been prevented altogether by an application during July.

Plot C, which was reserved as a check and received no treatment, showed considerable "scab" on both foliage and fruit, although the trees were all Bartletts, a variety which in this orchard has not been subject to severe attacks of "scab." The leaves began to shed badly in August. In picking the fruit it was very easy to distinguish the dividing line between plots C and D.

Plots D and E showed little difference in the quality of the fruit. The trees were all of the Bartlett variety and yielded a crop of perfect fruit. The leaves also were free from "scab" and were held until frost.

On the whole the conclusion seems a fair one, that the winter treatment of pears for scab hardly warrants the necessary outlay of time and money. As good results are obtained by thorough treatment during the summer only, as when such treatment has been preceded by a single application of copper sulphate in early spring. That the winter treatment is of some value however, is seen from the fact that trees so treated matured a better quality of fruit and retained their foliage better than trees which received no treatment at all.

Mr. Plant's report calls attention incidentally to one or two other points of interest, especially the effect of Bordeaux mixture upon lichens which are liable to infest the bark of pear trees. The experiments of Waite* have indeed already demonstrated the value of Bordeaux mixture in ridding pear trees of lichens; nevertheless it is interesting to note how thoroughly and permanently this result is attained. Not only were the trees which received Bordeaux mixture this season, completely freed from all lichen-growths, but the trees in plot C which were sprayed during the summer of 1893 and thus denuded of lichens, remained completely free from them this year although the trees in this plot were not sprayed. Not only are such growths a disfigurement to the tree, but they would seem to offer peculiar conveniences for the harboring during the winter, of spores which will serve to infest the trees the next spring.

* Journal of Mycology, Vol. vii, No. 3, pp. 264–268, with plates.

Finally Mr. Plant calls attention to the fact that in the case of currant bushes occupying the spaces between the rows of pear trees in his orchard, those in the neighborhood of the unsprayed trees and which therefore received no Bordeaux mixture, shed their leaves several weeks ahead of time; while those which incidentally received a portion of the spray intended primarily for the pear trees, held their leaves, and, if the mixture contained Paris green, were not affected by currant worms. These facts are worthy of note.

MISCELLANEOUS NOTES ON FUNGI.

By Wm. C. Sturgis.

The following notes upon parasitic fungi and insects are compiled from the results of personal observation in the field and from correspondence received during the past year.

Quince Rust, (*Roestelia aurantiaca*, Pk.). This rust has been abundant upon quinces during the past season. It manifests itself in swollen distortions of the young branches and fruit, the portions affected showing minute pimples which eventually produce a brilliant orange dust, the spores of the fungus. Letters received from various parts of the State indicate a prevailing impression that this disease has some connection with the "fire blight" described in the present report. The impression is a mistaken one; the two diseases are quite distinct as to both cause and effect. It may be well to repeat the fact that this rust as it appears upon quinces is but another form of the fungus common upon red cedars in spring and known as "cedar apples." The form occurring upon quinces is unable immediately to infect other quince trees, but attacks the red cedar, and it is upon the latter that the spores are produced which give rise to the quince rust. As regards treatment, my own experience indicates that the common fungicides are of little avail in preventing the disease, trees which have been sprayed continuously for four years as a protection against leaf spot (*Entomosporium maculatum*), showing rust almost equally with trees not sprayed.

In the case of the orange rust of apples, a disease very nearly related to quince rust, the successful use of Bordeaux mixture has been reported,* but as a rule it would seem more advisable to cut out and burn the diseased portions (especially in view of the

* U. S. Dept. Agr., Sec. of Veg. Path., Bull. 11, p. 46, 1890.

opinion held by many that the fungus is perennial in the tissues attacked), and to eradicate neighboring red cedars.

Scab and Mould of Peaches. (*Cladosporium carpophilum*, Thm.,) and (*Oidium fructigenum*, Kze. & Schm.) These two fungi attack plums and cherries as well as peaches. The mould, producing a grayish, powdery coating upon the fruit, and inducing rapid decay, is too well known to require any extended description.

The scab seems to have received but little recognition, yet it undoubtedly has been the cause of widespread injury to the peach crop. It may make its appearance upon the fruit at any time during the growing season, appearing first as small, circular, greenish spots, which increase in size, become darker and of a brownish color, and in severe cases may spread over the greater part of the surface of the fruit, preventing the normal expansion of the skin, retarding the ripening and mellowing of the flesh, and eventually producing deep cracks in the fruit. The fungus does not induce decay, but it renders the fruit unsightly and prevents an even ripening, thus considerably reducing its market value.

So far as I know, no definite experiments have been as yet undertaken with a view of testing the value of fungicides in preventing this disease of peaches. Bordeaux mixture has been recommended for the treatment of the disease as it affects plums and cherries;* but the peach, as shown by Arthur,† is less susceptible to successful treatment. The foliage is of great delicacy, and liable to injury from fungicides; and the downy character of the surface of the fruit prevents the fungicide from reaching the fungus thoroughly, since the latter grows upon the skin itself and is in a measure protected by the fruit hairs. Possibly early applications of weak Bordeaux mixture, containing no more than six pounds of copper sulphate and four pounds of lime to fifty gallons of water would serve to prevent the initial attack of the fungus without injury to the foliage. Experiments in this direction will be attempted during the coming season.

As regards the peach mould, the experiments of Chester‡ prove conclusively that the trouble can be largely prevented by the use of copper carbonate in suspension (1 lb. copper carbonate in 25 galls. water), the ammonia solution of copper carbonate (5 oz.

* Iowa Agr. Coll. Exp. Sta., Bull. 23, p. 920, 1894.

† Ind. Agr. Exp. Sta., Bull. 19, pp. 5–8, 1889.

‡ Del. Agr. Exp. Sta., Bull. xix, 1892.

copper carbonate, 3 pts. strong ammonia, 45 galls. water), or Bordeaux mixture. He recommends that copper sulphate in the proportion of one pound to twenty-five gallons of water be applied before the fruit buds begin to swell in early spring; that as soon as the fruit buds begin to swell either one of the fungicides above mentioned be applied, and again just before the buds open. A third application should be made as soon as the fruit shows signs of color, and two or three more at intervals of a week during the period of ripening. Whatever method of treatment be adopted, it must be borne in mind that the source of infection in this case, and probably in that of the scab, lies in the diseased fruit of the previous year. Too much stress therefore cannot be laid upon the necessity of gathering and burning all such fruit.

SOME INJURIOUS INSECTS.

By Wm. C. Sturgis.

The Onion Maggot (*Anthomyia ceparum*). Frequent complaints have been received regarding this pest, and a few notes upon the subject may prove of value. The adult insect, a small two-winged fly, deposits its eggs on the lower portion of the young onion plants during the months of April and May. In about a week the eggs give rise to small, whitish grubs or maggots which eat their way into the bulb upon which they feed for about two weeks. They then leave the bulb, enter the ground, and change to the pupa-condition, from which, in course of time, the adult flies emerge. Occasionally the maggots remain in the bulb and the brown pupæ are found in the stored onions. Several broods are produced during the summer.

Various methods of destroying this pest have been recommended. Ormerod* suggests rotation with some other crop in order that the flies emerging from the pupæ which remain in the soil, may not find onion plants at hand upon which to deposit their eggs; earthing the young plants well up above the collar so that the flies are prevented from reaching the bulb; pulling and destroying the plants first affected, by which means the migration of the maggots to sound bulbs is checked; the avoidance as far as possible of natural manures, in which the larvæ of these insects

* A Text book of Agricultural Entomology, pp. 49–56, 1892.

live; or finally the application of lime to the land. E. O. Orpet* recommends the following method which is well worth a trial. "Half a pint of kerosene is well mixed with a pailful of some dry material, preferably wood ashes, but sand, sawdust, or even dry soil will do fairly well; after the plants are well up and the trouble is at hand, a sprinkling of this mixture along the rows about twice a week during the time the fly does its work, will be found a sure prevention of the trouble. After the end of May there is little danger, as the onions are of a good size and not so liable to injury."

The Fir Mite. Early in June specimens of fir-branches (*Abies balsamia*) were received from West Cornwall, showing a peculiar curling of the young leaves at the extremities of the branches. Careful examination revealed the presence of numbers of small mites, insects belonging to the Spider Family, and related to the "red spider" commonly found upon greenhouse plants. These mites were of a dark brownish color, rather lighter beneath, and were undoubtedly the cause of the trouble. The leaves attacked were curled and twisted, showing the silvery lower surface, and in many cases were of a pale yellowish color, Plate VIII. In the axils of the leaves were to be seen the delicate webs spun by the mites. The appearance of the twigs indicated that these insects might very seriously interfere with the development of the new growth. The only reference which I have found to this subject is contained in a short note on p. 869 of the Fifth Report of the Entomological Commission of the U. S. Dept. of Agriculture, (1890). The insect is described and its effect upon the leaves is figured, but no suggestions are given as to remedial treatment.

If we may judge from analogy with what we know of the "red spider," and from the atmospheric conditions prevailing during its period of attack the past summer, we may conclude that this mite flourishes during extremely dry weather, and that in a comparatively damp season or locality there is but little fear of serious injury. In nurseries or plantations of small trees, where the tips are readily accessible, keeping the tips wet with water during very dry weather, or spraying them with a decoction of tobacco, would probably rid them of this pest.

Lice of apple and cherry trees. Much injury is caused every year to the young foliage of the apple and cherry by two species of lice, *Aphis Mali*, and *Myzus Cerasi*. The former, infesting

* Garden and Forest, Vol. vii, p. 187, 1894.

apple trees, is green; the latter, upon cherry, is black and shining. They often occur in enormous numbers, covering the lower surface of the leaves and causing them to become curled and dwarfed. The life-history of these insects is not yet fully known. In the spring the eggs which have been laid upon the twigs the previous autumn, hatch into young lice which quickly infest the leaves and suck out the juices. In ten days or less they are mature and begin producing young, thus increasing with great rapidity. Early in July they migrate from the apple and cherry to some other plant. (Webster states* in regard to the apple lice, that they migrate to wheat and other grasses). In the late summer or early autumn they return to the apple and cherry trees as winged females which at once produce a brood of wingless, egg-laying females. With the laying of these eggs the life-history is completed. If it were known definitely to what plants these lice migrated in the summer, we could the more readily suggest a remedy. As it is, kerosene emulsion or strong soapsuds seem to be the most practical substances for destroying the insects. Wherever it is possible the entire twig infested should be bent over and dipped thoroughly in the mixture; when this method is impracticable, spraying the trees frequently must be resorted to, although many of the lice will escape owing to the fact that they are protected within the curled leaves. The following modification of the kerosene emulsion has been suggested, and would seem to be more fatal to insects than the usual formula.

(1) To 3 quarts of kerosene add $1\frac{1}{4}$ pounds of pyrethrum powder, and let it stand four days in a close vessel. (2) Dissolve 10 ounces of common hard soap in $2\frac{1}{2}$ quarts of boiling water. Strain off $2\frac{1}{2}$ quarts of (1) and add it to (2) while the latter is still hot. Churn for five minutes through a force pump until the mixture is creamy. For use, dilute with 150 parts of cold water. The undiluted mixture may be kept indefinitely in glass fruit jars or other vessels, if thoroughly closed.

The Peach curculio (*Conotrachelus nenuphar*). This is the same insect which commonly attacks plums, cherries, and apples. It has not been reported as common in this State upon peaches, but from my own observations in a number of orchards I am convinced that it is far more common than is supposed and that it is to blame for much injury at present attributed to other causes. The curculio attacks the young fruit almost as soon as the petals

* Ohio Agr. Exp. Sta., 12th Ann. Rept., p. xxxv, 1894.

have fallen, cutting the well known crescent-like flap beneath which the egg is deposited. The fruit so injured is liable to fall prematurely, and if it remain upon the tree the injury soon becomes apparent from the gummy exudation oozing from the wound. Many growers are accustomed to shake the insects from the trees on to a white cloth, by means of a sudden jar, and this is perhaps the best method of destroying them; but it would seem that a very weak mixture of Paris green in water would kill the insects without injuring even the delicate foliage of the peach. A safe formula would be 4 ounces of Paris green in 45 gallons of water, to which are added 2 pounds of fresh lime slacked in 5 gallons of water. As in the case of Bordeaux mixture and Paris green, the lime tends to neutralize the caustic action of the arsenite.

The Peach bark beetle (*Scolytus rugulosus*, Ratz.). Late in September last, portions of the bark of a peach tree were sent to the Station from Cheshire, completely riddled with minute holes the size of a pin head. With the bark were specimens of a small, black beetle to which the injury was attributed. There was little difficulty in referring the insect to the species above named, a species originally imported from Europe, but now, on Bailey's authority, "widely distributed in eastern America."* The same writer states that it attacks the plum, apricot, cherry, pear, apple, quince, and some ornamental trees.

At present it is not sufficiently common in Connecticut to cause any serious apprehension, nor does it seem to attack trees which are otherwise thrifty and well cared for. Should it become a pest it could probably be held in check by applying to the bark some poisonous substance containing either Paris green, kerosene, or carbolic acid. Bailey suggests that all seriously affected branches and trees should be burned.

For fuller information upon this subject reference may be had to the investigations of Forbes published in Bull. 15 of the Ill. Agr. Exp. Station (1891).

* Cornell Univ. Agr. Exp. Sta., Bull. 74, p. 378, 1894.

NOTES ON SOME LEAF MINERS.

By W. E. Britton.

During the season of 1894, plants of several different species on and about the Station grounds were attacked by "leaf miners." Though of no great economic importance at present these insects essentially injure the plants which they attack.

The term "leaf miner" is applied to those insects which feed upon the soft interior part of the leaf just below the epidermis, and between the upper and under layers of epidermal cells which form the two surfaces of the leaf. This injury is done while the insect is in the larval or grub stage, that being the period of growth.

The egg is usually deposited just beneath the epidermis, and the larva as soon as hatched feeds upon the soft parenchymatous tissue surrounding it.

The leaf miners observed by the writer belong to two different zoölogical orders, (1) Diptera, or two-winged flies, and (2) Lepidoptera, the order including moths and butterflies.

Those here noticed belong to the Diptera. We have found a different species of insect upon each species of plant attacked, and in some cases two distinctly different insects upon the same plant. The leaves of the apple, pear, quince, grape, columbine and corn, growing upon the Station grounds, have been attacked by leaf miners during the past season, though it was only on the columbine and corn that the insects were made notably conspicuous by their attacks.

Corn Leaf Miner (*Odontocera dorsalis*, Loew).

This insect attacked the corn which was grown under glass in the vegetation experiment referred to in a previous article, page 73 of this Report. It was first noticed about July 1st when it began its operations as a miner. The adult pierces the tip of the leaf, and deposits an egg beneath the epidermis, and the larva as soon as hatched, begins tunneling between the two epidermal surfaces. The larva usually travels toward the base of the leaf, sometimes along the midrib, sometimes near the edge, and often in a crooked or zigzag path. The tunnel is very narrow, a mere line at first, but it gradually increases in width as the larva grows, and so is broadest at the end farthest from the starting point.

The tunnels vary in size and length. One was nearly straight, and measured 19½ inches in length, and ⅛ of an inch wide at the broadest part. This, however, was an extremely large one, and the dimensions of the majority were less.

The tunnel usually begins near the tip of the leaf, though not always. Sometimes several larvæ are at work in the same leaf, with tracks parallel or crossing each other. The track usually shows more distinctly from the upper side of the leaf, but can generally be seen from either side. See Plate X. It is rendered nearly white and semi-transparent by the removal of the green coloring matter of the leaf.

In the enlarged end of this tunnel the larva may be found during its feeding stage. When it becomes full-grown, it retreats an inch or two in the tunnel and enters the pupa stage which is passed inside the leaf. Like all dipterous larvæ the skin hardens, and becomes the covering of the puparium.

After a short time it emerges from its prison, punctures the skin of the corn leaf, and escapes, a small two-winged fly.

The larva is a footless grub, about ⅛ of an inch in length when full-grown. It is pale yellow in color, and almost transparent. On entering the pupa state it becomes considerably darker in color, and shrinks slightly.

The adult is a small fly. Its head, thorax, and abdomen are nearly black, slightly marked with light brown or yellow. The wings are colorless, legs yellow, and the insect is covered with hairs.

Specimens sent to L. O. Howard, Entomologist of the Department of Agriculture at Washington, and submitted by him for determination to his assistant, Mr. D. W. Coquillett, a specialist in the order Diptera, were pronounced to be *Odontocera dorsalis*, Loew, of the family Agromyzidæ, an insect with habits hitherto unknown. The insect in its different stages of development is shown in Plate XI, prepared from original drawings.

a. Adult fly. *b.* Young larva. *c.* Pupa, all greatly enlarged.

Only a few leaves of the corn growing in the Station garden were attacked by this leaf miner, but the lower leaves of nearly every corn plant in the greenhouse were more or less tunneled by the larvæ. It is not probable that it will ever become a serious enemy to the field crop. If it should, however, it would be a difficult pest to fight, for the larva being inside the leaf cannot be reached by spraying. The only way to destroy them is to

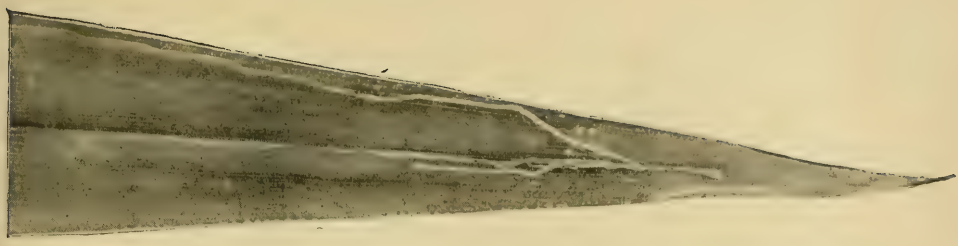


PLATE X. Corn Leaf injured by Leaf Miner, *Odontocera Dorsalis.*

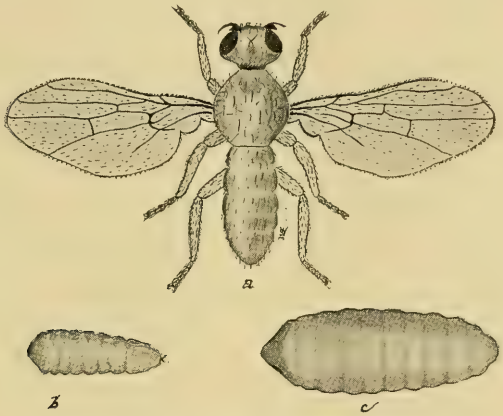


PLATE XI. Leaf Miner. *Odontocera Dorsalis.*

PLATE XII. Columbine Leaves injured by Leaf Miner, *Phytomyza Aquilegiæ.*

examine the affected leaves for each individual, which will be found near the enlarged extremity of the tunnel, where it may be destroyed by a knife or needle. Of course this method would be utterly impracticable in farm practice. Natural enemies will doubtless keep this leaf miner in check.

Hymenopterous insects came from two of the pupæ which were gathered. These both belonged to the same species which is evidently parasitic upon *Odontocera dorsalis*. This parasitic insect is stated by Mr. Howard to be a new species of *Sphegigaster*.

Columbine Leaf Miner (*Phytomyza aquilegiæ*.)

Several species of Aquilegia (Columbine) growing about the Station grounds were severely attacked by a small fly, which deposits its egg either on or inside the leaf. The larva as soon as hatched, begins to tunnel in the soft parenchymatous tissue of the leaf just beneath the epidermis.

My attention was first called to the injury June 26th, and from that time continuously until frost came, the leaves showed indications of the presence of the leaf miner. This signifies that there are several broods each year.

Some young seedlings of *A. Canadensis* were severely injured, and old plants of other species lost nearly all their leaves from the effects of its attack. The soft part was entirely eaten out in some cases, and nothing left but the skeleton or framework of the leaf.

The full-grown larva is a footless grub one-sixteenth of an inch in length. It emerges from its mine to pupate, and fastens itself to the underside of the leaf, eight or ten being often found hanging from the under surface of a single leaf.

The covering, during this stage of the insect's transformations, is formed by the hardening of the skin which the larva casts but does not vacate. It turns to a dark brown color, and shrinks slightly in length, the thickness remaining about the same. Finally the end of the covering is ruptured, and the adult comes forth a small two-winged fly. One specimen was found pupating in the mine of the leaf, but this does not appear to be the usual habit.

Adults were reared from the mines of the leaf, and sent to the U. S. Department of Agriculture for identification. Dr. C. L. Marlatt, Acting Entomologist, replied as follows: "Mr. D. W.

Coquillett reports that there are two distinct species of *Phytomyza*, the larvæ of which mine the leaves of Columbine in Europe, viz: *P. ancholiæ*, Desvoidy, an account of which is given in the Annales de la Soc. Entom. de France, 2d series, Vol. x, p. 153; and *P. aquilegiæ*, Hardy, described in the Annals and Magazine of Natural History, 2d series, Vol. iv, p. 392. Your species agrees so well with the last named that there is scarcely any doubt in so referring it, although it has not hitherto been reported as occurring in this country."

Plate XII shows leaves of *Aquilegia Canadensis* injured by larvæ of *Phytomyza aquilegiæ*.

No remedy has yet been suggested except to pick and destroy the infested leaves. If this leaf miner has no parasite to keep it in check, it will soon become so troublesome as to greatly diminish the use of the Columbine as a hardy flowering perennial.

THE PROTEIDS OF THE RYE KERNEL.

By Thomas B. Osborne.

The proteids of this seed have been but little studied and the statements published leave the subject in much confusion.

Einhof, who in 1805* undertook an analysis of rye, was the first to make observations on the proteids obtained therefrom. He found that an aqueous extract of rye meal contained two distinct proteid substances, one coagulating on boiling, and insoluble in alcohol, which he called albumin, and the other not coagulating, but soluble in alcohol, which he called gluten [kleber]. The latter he considered to be identical with the similar substance extracted from wheat gluten by alcohol. Treatment with alcohol yielded much more "kleber" than was extracted by water alone. It is interesting to note that Einhof in this investigation first discovered that characteristic differences exist between different kinds of vegetable proteid matter, it being thought at that time that gluten and albumin were simply modifications of the same body which under like conditions would show the same properties.

Heldt† in 1843 published a description of the proteid taken up by alcohol from rye meal. He prepared it by extracting the meal with hot alcohol, distilling off the alcohol and treating the residue with ether to remove fat, and with water to remove ether and sugar.

This preparation was analyzed with the following result:

Carbon	56.38
Hydrogen	7.87
Nitrogen	15.83
Sulphur, Oxygen	19.92
	100.00

Heldt remarked, "the same composition was found by Scherer and Jones for other nitrogenous constituents of plants, plant-casein, plant-albumin and plant-gelatin, to which last this body appears to stand nearest."

* Jour. d. Chem. v. Gehlen, V, 131.

† Ann. d. Chem. u. Phar., XLV, 195.

Jones* obtained albumin from rye by boiling the aqueous extract and treating the resulting coagulum with ether. He states that this albumin contained:

Carbon	54.74
Hydrogen	7.77
Nitrogen	15.85
Oxygen	21.64
	100.00

Verdeil,† contrary to the experience of Einhof, von Bibra, Ritthausen and the writer obtained gluten from rye meal by kneading and washing in a cloth until starch was removed. He states that there remained a tough, glutinous substance which could be easily drawn into threads. This gluten he says was not pure but was contaminated with a substance soluble in alcohol. When thoroughly extracted with alcohol he considered it to be pure. He determined sulphur in the gluten and found 0.989 and 0.972 per cent. Von Bibra‡ considered the proteid extracted from rye by alcohol to be the same as that similarly obtained from wheat. He gave the nitrogen content of this body as 15.73, 15.52 and 15.50 and the sulphur as 0.973 and 0.950 per cent. He also recognized the presence of "casein" which he did not analyze, and found from 1.565 to 2.799 per cent. of albumin which contained 15.53 and 15.42 per cent. of nitrogen. He considered the proteids of rye to be same as those of wheat.

Ritthausen§ described three proteid substances which he found in rye, albumin, soluble in water, mucedin, soluble in alcohol, and gluten-casein, soluble in dilute potash water but insoluble in water and cold alcohol.

Albumin, he says, is present in the aqueous extracts but he made no further examination of this body. The mucedin he considers to be the only proteid, soluble in alcohol, present in the rye kernel and this he regarded as similar to the mucedin which was believed to exist in the wheat kernel. He was unable to detect the presence of gliadin. Mucedin was prepared by extracting the meal with hot alcohol of 85 per cent. and concentrating and cooling the solution. The deposited substance was further

* Ann. d. Chem. u. Phar., XL, 66.

† Ann. d. Chem. u. Pharm., LVIII, 319.

‡ Die Getreidearten u. das Brod, Nuernberg, 1860, 291.

§ Jour. f. prakt. Chem., XCIX, 439, and Die Eiweisskoerper, etc., Bonn, 1872, p. 83.

extracted with alcohol and ether. It was then dissolved in acetic acid and fractionally precipitated with potash. He states the composition of the substance as:

Carbon	53.61
Hydrogen	6.79
Nitrogen	16.84
Sulphur	0.50
Oxygen	22.26
	100.00

The gluten-casein was obtained by extracting the rye meal directly with very dilute potash-water, precipitating with acetic acid and washing with water, alcohol and ether. Two preparations were made and gave as an average the following figures on analysis:

Carbon	52.14
Hydrogen	6.93
Nitrogen	16.38
Sulphur	1.06
Oxygen	23.49
	100.00

Sidney Martin* states that wheat, rye and barley contain a globulin substance similar in properties to animal myosin, being soluble in 10–15 per cent. sodium chloride solutions, precipitated therefrom by saturation with sodium chloride and with magnesium sulphate and coagulating at 55° to 60°. This globulin is precipitated by dialysis and thereby is converted into the albuminate form. It is very evident from the foregoing summary of previous work that we have no satisfactory knowledge of the rye-proteids.

In presenting the results of my investigation the subject may be most conveniently discussed under the following heads:

A, proteids soluble in water, B, proteids insoluble in water but soluble in saline solutions, C, proteids insoluble in water and in saline solutions and soluble in alcohol, and, D, proteid insoluble in water, saline solutions, or alcohol but soluble in dilute alkalies.

A, Proteids soluble in Water. Leucosin. Proteose.

The proteids soluble in water are best examined in extracts made in the first instance with 10 per cent. sodium chloride solution from which subsequently the soluble salts have been removed

* Jour. Physiol., VIII, viii.

by prolonged dialysis. When water is applied to the grain it becomes a weak saline solution which not only takes up globulins but also extracts gliadin whose presence greatly complicates the examination of the water soluble proteids. Rye meal* was accordingly exhausted with a solution containing 10-per cent. sodium chloride and the extract, after syphoning from the subsided insoluble matters, was freed from salts and globulin by dialysis in river water and filtration. The resulting solution yielded no more globulin by dialysis in distilled water and contained only those proteids extracted from the seed which were soluble in pure water. As the extract was bulky the proteids were precipitated by saturation with ammonium sulphate and thereupon dissolved in water. A comparatively concentrated solution was thus obtained which was very nearly freed from ammonium sulphate by dialysis. It then had the following properties. When heated slowly it became turbid at 52° and particulate at 63°. After filtering from this coagulum nothing more separated even on boiling. Saturation of the dialyzed solution with sodium chloride gave a precipitate that dissolved readily in water to a solution, which, heated to 63°, yielded a coagulum of albumin. The filtrate from this coagulum was again saturated with salt and a considerable precipitate obtained showing that with the albumin some proteose-like body was thrown down. Nitric acid added to the solution of this precipitate in water gave a precipitate which dissolved on warming and reappeared on cooling. The solution after filtering out the first precipitate of proteose and albumin, produced by saturation with sodium chloride, gave more precipitate on adding acetic acid, showing the presence of a further quantity of proteose. The coagulum above described, which separated on heating its solution to 65°, was washed thoroughly with water, alcohol, absolute alcohol and ether and dried over sulphuric acid. When dried at 110° it had the following composition:

COAGULATED RYE ALBUMIN, LEUCOSIN, *Preparation* 1.

	I.	II.	Average.	Ash-free.
Carbon	52.31	----	52.31	52.57
Hydrogen	6.78	----	6.78	6.81
Nitrogen	16.14	16.11	16.13	16.22
Sulphur } Oxygen }	----	----	----	24.40
				100.00
Ash	0.51			

* The rye meal used throughout this work was obtained by grinding, in the laboratory, portions of clean and fresh winter rye, as needed for each extraction.

Another extract was examined in a slightly different way. 1000 grams of rye meal were extracted with 11 liters of 10 per cent. sodium chloride solution and, in order to get rid of the large amount of gum taken up, the solution, after filtering, was dialyzed and then saturated with ammonium sulphate. The precipitate thus produced was dissolved, as far as possible in 10-per cent. sodium chloride brine, filtered clear and dialyzed until chlorides were removed. The solution after filtering clear was then heated to 65° and the albumin that separated was filtered out, washed thoroughly with hot water, with alcohol and with ether and dried over sulphuric acid. This preparation, **2**, weighed 1.21 grams and had the following composition:

COAGULATED RYE ALBUMIN, LEUCOSIN, *Preparation* **2**.

		Ash-free.
Carbon	53.04	53.29
Hydrogen	6.70	6.74
Nitrogen	16.57	16.65
Sulphur } Oxygen }	----	23.32
		100.00
Ash	0.50	

The solution containing the proteoses, filtered from preparation **2**, was then treated with 20 per cent. of its weight of dry sodium chloride and a little two-tenths per cent. hydrochloric acid was added which gave a considerable precipitate. This was filtered out, dissolved in distilled water and the solution dialyzed till free from chlorides. This solution then gave a precipitate with nitric acid, which dissolved on warming and precipitated again on cooling. The solution concentrated to a syrup on a water bath was precipitated by pouring into absolute alcohol. The precipitate when dried over sulphuric acid weighed 0.41 gram or one-third as much as the albumin. The filtrate, from the precipitation of this substance [with 20 per cent. of sodium chloride and acid], was saturated with ammonium sulphate and the precipitate thus produced filtered out and dissolved in distilled water. With copper sulphate and potash this substance gave a clear pink color. Its solution gave no precipitate on adding nitric acid until it had been saturated with sodium chloride, when a slight precipitate fell. It yielded no precipitate with copper sulphate. These reactions indicate that besides albumin the aqueous extract contains small quantities of proto- and deutero-proteose.

Again, 2000 grams of rye meal were treated with 10-per cent. sodium chloride solution and the extract filtered and saturated with ammonium sulphate. The precipitate produced was dissolved in 10-per cent. sodium chloride solution, filtered and dialyzed until all chlorides were removed. After filtering clear the solution was heated to 65° for some time and the coagulum filtered out, washed with hot water, alcohol and ether and dried for analysis, preparation **3.** The filtrate from **3,** was then concentrated by boiling, during which a coagulum developed. This was filtered out, washed as usual and dried for analysis, preparation **4.**

COAGULATED RYE ALBUMIN, LEUCOSIN, *Preparation* **3.**

	I.	II.	Average.	Ash-free.
Carbon	53.41	53.32	53.37	53.52
Hydrogen	6.90	6.82	6.86	6.88
Nitrogen	16.73	----	16.73	16.78
Sulphur } Oxygen }	----	----	----	22.82
				100.00
Ash	0.30			

COAGULATED RYE ALBUMIN, LEUCOSIN, *Preparation* **4.**

	I.	II.	Average.	Ash-free.
Carbon	52.64	52.53	52.58	52.86
Hydrogen	6.76	6.73	6.75	6.79
Nitrogen	16.86	----	16.86	16.95
Sulphur } Oxygen }	----	----	----	23.40
				100.00
Ash	0.56			

Another extract was made by treating 1700 grams of rye meal with 16 liters of water. After standing over night the solution was filtered off and saturated with ammonium sulphate. The meal residue was treated again in the same way and the filtered extract, after saturating with ammonium sulphate, was added to that first obtained. The precipitated proteids were then dissolved in water yielding a very gummy solution. As this solution was bulky the proteids were again precipitated with ammonium sulphate and the precipitate after filtering out was treated with 3 liters of 10-per cent. sodium chloride solution. The whole was then dialyzed, it having been found that these viscid solutions lost their gummy character on dialysis. After 8 days all the gum had disappeared. The solution was then readily filtered clear. In order to reduce the volume of the solution it was again

saturated with ammonium sulphate and the large precipitate treated with about a liter of 10-per cent. sodium chloride solution. A turbid liquid resulted which was not cleared by passing through filter paper but on standing became clear and the sediment was found to consist of gliadin, which is to be noticed later. Gliadin is soluble to a considerable extent in pure water and in water containing but a very small amount of dissolved salts, but the addition of a little sodium chloride to its solution precipitates it completely. After the solution had entirely cleared by subsidence it was dialyzed free from chlorides and heated to 65°. The resulting coagulum was then filtered out, washed and dried in the usual manner and found to weigh 1.55 gram. The composition of this preparation was as follows:

Coagulated Rye Albumin, Leucosin, *Preparation* **5.**

		Ash-free.
Carbon	52.67	52.91
Hydrogen	6.78	6.81
Nitrogen	16.57	16.65
Sulphur	1.40	1.40
Oxygen		22.23
		100.00
Ash	0.47	

The meal residue, from the water extract that yielded **5**, was then treated with 10-per cent. sodium chloride solution and the filtered extract saturated with ammonium sulphate, the precipitate so obtained was filtered out, dissolved in water and sodium chloride solution and dialyzed till free from chlorides. The liquid was then filtered clear and heated to 65°. The coagulum washed and dried weighed 1.92 grams, being therefore considerably greater than the preparation obtained from the aqueous extract. It would appear therefore probable that the albumin forms a constituent of the aleurone grains which may not be broken up until treated with saline solutions. The following figures show the composition of this preparation:

Coagulated Rye Albumin, Leucosin, *Preparation* **6.**

		Ash-free.
Carbon	52.55	52.77
Hydrogen	6.67	6.70
Nitrogen	16.61	16.68
Sulphur	1.29	1.29
Oxygen		22.56
		100.00
Ash	0.42	

SUMMARY OF ANALYSES OF COAGULATED RYE ALBUMIN, LEUCOSIN.

	1.	2.	3.	4.	5.	6.	Average.
Carbon	52.57	53.29	53.52	52.86	52.91	52.77	52.97
Hydrogen	6.81	6.74	6.88	6.79	6.81	6.70	6.79
Nitrogen	16.22	16.65	16.78	16.95	16.65	16.68	16.66
Sulphur	24.40	23.32	22.82	23.40	1.40	1.29	1.35
Oxygen					22.23	22.56	22.23
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Five hundred grams of rye flour* were extracted with 2000 c. c. of 5-per cent. sodium chloride solution and 1000 c. c. of the clear filtered extract were dialyzed till free from chlorides. The solution was then filtered and heated for 24 hours in a water bath of 70°. The coagulated albumin was filtered out, washed with water, alcohol and ether, and dried over sulphuric acid, and found to weigh 1.08 grams, equivalent to 0.43 per cent. of the flour.

So far as tested this albumin agrees in all respects with that obtained from wheat.† The variations in composition of these preparations are considerable but perhaps not greater than might be expected.

The aqueous and saline extracts of the rye meal contain much gum and coloring matters which render the isolation of pure proteids very difficult. It will be seen, however, that the preparations of wheat albumin and rye albumin have very nearly the same average composition and that both proteids show the same reactions and coagulate at the same temperature. They are unquestionably the same substance, for which I have adopted the name *leucosin.*

COAGULATED LEUCOSIN.

	Wheat. Av. of 5 analyses.	Rye. Av. of 6 analyses.
Carbon	53.02	52.97
Hydrogen	6.84	6.79
Nitrogen	16.80	16.66
Sulphur	1.28	1.35
Oxygen	22.06	22.23
	100.00	100.00

The proteoses of the rye also show the same reactions as those of the wheat kernel, and so far as it is possible to determine they are identical.

* Made by the Health Food Company of New York.

† Am. Chem. Jour., XV, p. 408; also Ann. Report of this Station for 1893, p. 179.

B. Proteid soluble in Saline Solutions. Edestin.

Owing to the large amount of gum extracted from the rye meal, the preparation of the globulin in a pure state was found to be extremely difficult. Such preparations as were made disagreed in composition and in only one case was a substance obtained which appeared to be pure enough to warrant the publication of its analysis. So far as could be detected the globulin which separated on dialysis had the same properties as that similarly derived from wheat. One preparation of this globulin, which had nearly the same composition as the wheat globulin and appeared to be free from gum and other impurities, was obtained as follows:—5000 grams of rye flour, made by the Health Food Co. of New York, were extracted with 15 liters of 5-per cent. sodium chloride solution and the extract filtered clear. 9 liters of extract were thus obtained, being approximately equal to a complete extraction of 3 kilos of rye flour.

The entire solution was dialyzed for four days in order to remove the greater part of the gum. The extract was saturated with ammonium sulphate, the precipitate filtered out, suspended in water and dialyzed for three days. Most of the substance was now dissolved and the insoluble matter was filtered out, washed with sodium chloride solution and the filtrate and washings returned to the dialyzer. When free from chlorides the solution was filtered from a small precipitate and this latter washed with water, alcohol and ether and dried over sulphuric acid. Only 1.21 grams of globulin were obtained, which when dried at 110° had the following composition:

Rye Globulin, Edestin, *Preparation* 7. Wheat Globulin, Edestin.

		Ash-free.	Av. of 5 analyses.
Carbon	51.03	51.19	51.03
Hydrogen	6.72	6.74	6.85
Nitrogen	18.14	18.19	18.39
Sulphur		23.88	0.69
Oxygen	----		23.04
Ash	0.33		
		100.00	100.00

The writer has no doubt that this globulin is identical with the *edestin* found in the wheat kernel and other seeds,* but owing to the difficulties encountered in preparing it from rye, further evidence on this point was not obtained.

* Annual Report of this Station for 1893, pp. 179 and 216.

With reference to Martin's statement concerning the presence of myosin—what is written on that point in the paper by Osborne and Voorhees on the Proteids of the Wheat Kernel applies equally to rye.*

C. Proteid soluble in Alcohol. Gliadin.

After extraction with sodium chloride solution, alcohol of 75 to 80 per cent. takes up a considerable quantity of proteid. 100 grams of rye meal were extracted thoroughly with 10-per cent. sodium chloride solution and then with 75-per cent. alcohol. The alcoholic extract was evaporated to very small volume and the separated proteid washed with water and ether and then dried. It weighed 3.93 grams, being therefore nearly 4. per cent. of the meal. 2000 grams of rye meal were then extracted with alcohol of 0.9 specific gravity, four successive times. Each extract, after filtering clear, was concentrated by distillation on a water bath. The first three extracts yielded on cooling a deposit of proteid but the fourth contained almost none. Each residue was then washed with water and dissolved in 75-per cent. alcohol. The substance from the first extract yielded an insoluble residue which when washed with dilute alcohol, absolute alcohol and ether, gave preparation **8.** This dried at 110° contained 17.09 per cent. of nitrogen. The solutions of the substances from the three extracts in dilute alcohol, were concentrated to about one-fourth their original volume and cooled, when the dissolved proteid separated. The substance from the first extract was digested with absolute alcohol which dissolved a part of it, then with ether and dried, giving preparation **9.** The residue from the second extract was washed superficially with water and then treated in a divided state with distilled water until dissolved. A little saturated sodium chloride solution was then added and the proteid wholly precipitated. The precipitate was then thoroughly dehydrated with absolute alcohol, digested with ether, and dried. This formed preparation **10.** The proteid separated from the third extract was digested with absolute alcohol and with ether, and yielded a small quantity of proteid, preparation **11,** which when dried contained, ash-free, 16.89 per cent. of nitrogen. The absolute alcohol used in dehydrating preparation **9,** with help of the water which it extracted, dissolved a considerable quantity of proteid. This was precipitated by adding a few drops

* Am. Chem. Jour., XV, p. 415.

of sodium chloride solution. The precipitate produced was then digested with absolute alcohol and ether and when dried was found to contain, ash-free, 16.02 per cent. of nitrogen. The preparation was therefore redissolved in dilute alcohol, filtered perfectly clear, concentrated to small volume and cooled. The proteid separating was then treated as before with absolute alcohol and ether and yielded preparation **12.** The proteid thus extracted showed in all respects the properties of wheat gliadin, and it will be seen that it has nearly the same composition.

RYE GLIADIN, *Preparation* **9.**

	I.	II.	Average.	Ash-free.
Carbon	52.76	----	52.76	52.84
Hydrogen	6.81	----	6.81	6.82
Nitrogen	17.14	17.23	17.19	17.22
Sulphur, Oxygen	----	----	----	23.12
Ash	0.16			100.00

RYE GLIADIN, *Preparation* **10.**

	I.	II.	Average.	Ash-free.
Carbon	53.06	52.90	52.98	53.23
Hydrogen	6.83	7.11	6.97	7.00
Nitrogen	17.13	17.17	17.15	17.23
Sulphur, Oxygen	----	----	----	22.54
Ash	0.48			100.00

RYE GLIADIN, *Preparation* **12.**

	I.	II.	Average.	Ash-free.
Carbon	52.99	53.11	53.05	53.11
Hydrogen	6.73	6.83	6.78	6.79
Nitrogen	17.57	----	17.57	17.59
Sulphur	1.44	----	1.44	1.44
Oxygen	----	----	----	21.07
				100.00
Ash	0.12			

1000 grams of rye meal were thoroughly extracted with 10-per cent. sodium chloride solution and drained as dry as possible on filters. The extracted residue was then treated with alcohol of 0.860 specific gravity four consecutive times. The four red-brown extracts were filtered clear, concentrated till most of the alcohol was removed and then cooled. The precipitates thus obtained were united and treated at first with stronger and afterwards with

75-per cent. alcohol until all soluble was dissolved. A considerable residue remained which appeared to be coagulated gliadin. This was washed thoroughly with absolute alcohol and ether, and when dried weighed 5.62 grams, preparation **13.** The dissolved proteid, after filtering its solution perfectly clear, was separated by concentrating to small volume and cooling. The deposit was then treated with absolute alcohol, dissolved again in a little dilute alcohol and precipitated by pouring into absolute alcohol. The proteid, preparation **14,** separated perfectly colorless, in a finely divided state. When dried it weighed 11.66 grams.

RYE GLIADIN, *Preparation* **13.**

	I.	II.	Average.	Ash-free.
Carbon	52.36	----	52.36	52.62
Hydrogen	6.73	----	6.73	6.76
Nitrogen	17.75	17.59	17.67	17.75
Sulphur	1.18	----	1.19	1.19
Oxygen	----	----	----	21.68
				100.00
Ash	0.51			

RYE GLIADIN, *Preparation* **14.**

	I.	II.	Average.	Ash-free.
Carbon	52.74	----	52.74	52.93
Hydrogen	6.73	----	6.73	6.75
Nitrogen	17.32	17.52	17.42	17.48
Sulphur	1.23	----	1.23	1.23
Oxygen	----	----	----	21.61
				100.00
Ash	0.37			

These two preparations formed together 1.73 per cent. of the rye meal and have the composition of wheat gliadin. In order to prevent contamination of this proteid with the gum contained in rye meal, which Ritthausen* states to be freely soluble in 50-per cent. alcohol, the following method was tried.

After extracting rye meal with 10-per cent. sodium chloride brine the residue was treated with alcohol so strong that with the water retained by the meal, a mixture resulted containing about 75 per cent. of alcohol. After standing over night the extract was syphoned from the residue and greatly diluted with water. The proteid separated on standing and was filtered out and dis-

* Die Eiweisskoerper, etc., Bonn, 1872, p. 96, and Jour. f. prakt. Chem., XCIX, p. 454, and CII, p. 321.

solved in 75-per cent. alcohol. This solution was filtered perfectly clear, concentrated, cooled and the separated proteid treated with absolute alcohol and ether and dried. The resulting preparation **15,** was perfectly white. The residual meal was again extracted with 75-per cent. alcohol and the extract filtered clear, concentrated to one-fourth its volume, cooled, the precipitated proteid again dissolved in 75-per cent. alcohol, filtered clear, concentrated, cooled, and the separated proteid washed repeatedly with water. The substance was again dissolved in dilute alcohol and the clear solution precipitated by pouring into absolute alcohol. The precipitate produced was still again dissolved in dilute alcohol and a second time precipitated by pouring into absolute alcohol. The precipitate thus resulting was dissolved in dilute alcohol and precipitated by pouring into water and adding a little salt. The final pure white precipitate was digested with absolute alcohol and ether and dried, giving preparation **16.**

RYE GLIADIN, *Preparation* **15.**

	I.	II.	Average.	Ash-free.
Carbon	52.03	52.09	52.06	52.40
Hydrogen	6.78	6.91	6.85	6.89
Nitrogen	17.80	----	17.80	17.91
Sulphur	1.23	----	1.23	1.24
Oxygen	----	----	----	21.56
				100.00
Ash	0.68			

RYE GLIADIN, *Preparation* **16.**

	I.	II.	Average.	Ash-free.
Carbon	52.74	52.65	52.70	53.03
Hydrogen	6.90	6.96	6.93	6.97
Nitrogen	17.39	----	17.39	17.50
Sulphur	1.29	----	1.29	1.30
Oxygen	----	----	----	21.20
				100.00
Ash	0.65			

Another preparation of this substance was made by extracting 3000 grams of rye flour directly with 75 per cent. alcohol. The extract was concentrated to one-fourth its volume and the proteid which separated on cooling was washed many times with distilled water and dissolved in dilute alcohol, yielding a clear solution. This was then poured into three times its volume of absolute alcohol and an opalescent mixture obtained which depos-

ited a curdy precipitate after adding a little sodium chloride solution. The strong alcoholic solution from which this separated was clear and of a deep yellow color. The precipitate was treated with absolute alcohol as long as this was colored. During the process the substance was rubbed up to a fine powder. It was finally digested with ether for 24 hours and dried over sulphuric acid. This preparation, **17,** weighed 58 grams and was perfectly white. It formed very nearly 2 per cent. of the meal.

RYE GLIADIN, *Preparation* **17.**

Carbon	52.68
Hydrogen	6.71
Nitrogen	17.89
Sulphur	1.22
Oxygen	21.50
Ash	0.00
	100.00

In order to establish conclusively whether more than one alcohol-soluble proteid is contained in the rye-kernel, five preparations were made from the same portion of meal, by fractional precipitation. 4000 grams of rye meal were thoroughly extracted with 10-per cent. sodium chloride solution and the greater part of the bran removed by washing the meal through coarse cloth with the salt solution. The residue after decanting the salt solution was extracted with 75-per cent. alcohol, the extract was filtered clear and divided into two parts. The first part was concentrated to one-fourth and cooled, the second to one-half. The precipitated proteid from each was washed repeatedly with distilled water, dissolved in a small amount of 75-per cent. alcohol, filtered clear and precipitated by pouring into absolute alcohol. The proteid thus separated was digested with absolute alcohol and with ether. From the first portion of the alcoholic extract, preparation **18** was obtained, from the second, preparation **19.** These had the following composition:

RYE GLIADIN, *Preparation* **18.**

		Ash-free.
Carbon	51.90	52.67
Hydrogen	6.87	6.97
Nitrogen	17.50	17.76
Sulphur	1.26	1.27
Oxygen	----	21.33
		100.00
Ash	1.48	

RYE GLIADIN, *Preparation* **19.**

		Ash-free.
Carbon	52.04	52.40
Hydrogen	6.66	6.71
Nitrogen	17.77	17.89
Sulphur	1.15	1.16
Oxygen	----	21.84
		100.00
Ash	0.71	

The water washings from these two preparations were severally mixed with a little saturated sodium chloride solution which gave a considerable precipitate in each. These precipitates were then washed superficially with distilled water, dehydrated with absolute alcohol and treated with ether. The washings from **18** yielded preparation **20,** those from **19,** preparation **21.**

RYE GLIADIN, *Preparation* **20.**

	I.	II.	Average.	Ash-free.
Carbon	51.36	51.55	51.46	53.05
Hydrogen	7.07*	6.61	6.61	6.92
Nitrogen	17.64	17.61	17.63	18.17
Sulphur	1.14	----	1.14	1.17
Oxygen	----	----	----	20.69
				100.00
Ash	3.01			

RYE GLIADIN, *Preparation* **21.**

	I.	II.	Average.	Ash-free.
Carbon	52.01	----	52.01	52.37
Hydrogen	6.88	----	6.88	6.93
Nitrogen	17.99	17.97	17.98	18.10
Sulphur	1.04	----	1.04	1.05
Oxygen	----	----	----	21.55
				100.00
Ash	0.71			

The mother liquors from which **18** and **19** separated, after concentration, were united, further concentrated and cooled. The portion so separated was washed with water, dissolved in alcohol, the solution filtered clear and precipitated by pouring into absolute alcohol and after digesting with absolute alcohol and ether yielded preparation **22.**

* Omitted in average.

RYE GLIADIN, *Preparation* 22.

		Ash-free.
Carbon	48.44	52.46
Hydrogen	6.22	6.73
Nitrogen	16.68	17.94
Sulphur	0.91	0.99
Oxygen	----	21.88
		100.00
Ash	7.67	

SUMMARY OF ANALYSES OF RYE GLIADIN.

	9.	10.	12.	13.	14.	15.	16.
Carbon	52.84	53.23	53.11	52.62	52.93	52.40	53.03
Hydrogen	6.82	7.00	6.79	6.76	6.75	6.89	6.97
Nitrogen	17.22	17.23	17.59	17.75	17.48	17.91	17.50
Sulphur	23.12	22.54	1.44	1.19	1.23	1.24	1.30
Oxygen			21.07	21.68	21.61	21·56	21.20
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

	17.	18.	19.	20.	21.	22.	Average.
Carbon	52.68	52.67	52.40	53.05	52.37	52.46	52.75
Hydrogen	6.71	6.97	6.71	6.92	6.93	6.73	6.84
Nitrogen	17.89	17.76	17.89	18.17	18.10	17.94	17.72
Sulphur	1.22	1.27	1.16	1.17	1.05	0.99	1.21
Oxygen	21.50	21.33	21.84	20.69	21.55	21.88	21.48
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Comparing these results with those obtained by Osborne and Voorhees in analyzing gliadin from wheat* it is seen that they agree very closely, similar variations between the analyses existing in both cases. The averages of the two series of analyses agree well, as shown by the following figures:

GLIADIN.

	Wheat.	Rye.
Carbon	52.72	52.75
Hydrogen	6.86	6.84
Nitrogen	17.66	17.72
Sulphur	1.14	1.21
Oxygen	21.62	21.48
	100.00	100.00

In all their properties wheat gliadin and rye gliadin resemble each other so exactly as to leave no doubt of their chemical identity. Ritthausen, as already stated, failed to find gliadin in rye

* Amer. Chem. Jour., XV, p. 436.

meal and described the proteid soluble in alcohol as mucedin, having a lower nitrogen and higher carbon content. This disagreement is doubtless due to impurities in Ritthausen's preparations, which, as he mentions, contained coloring matter that could not be removed. This color was probably a result of extracting with hot alcohol, which Ritthausen appears to have used in all cases, cold alcohol having given him a small yield of proteid. I had, however, no trouble in obtaining an abundant yield of gliadin with cold alcohol of 70 per cent., and thereby have extracted far less coloring matter than with hot alcohol.

D. Proteid soluble only in dilute Alkalies.

The sample of rye flour previously used is this work contained 1.52 per cent. of nitrogen. The amount of nitrogen soluble in salt solution and in dilute alcohol was determined in this flour by extracting 100 grams with a large quantity of 5-per cent. sodium chloride solution and then with 75-per cent. alcohol. The residue was then thoroughly air-dried and found to weigh 78 grams. This residue contained 0.55 per cent. of nitrogen. The 100 grams of flour therefore contained 1.52 grams of nitrogen of which 0.43 grams remained after extraction and 1.09 grams was soluble in dilute salt solution and alcohol, or in other words, 71.7 per cent. of the nitrogen was soluble in the reagents named and 28.3 per cent. was insoluble. In the wheat kernel a considerable part of the nitrogen was likewise found to be insoluble in salt solution and in dilute alcohol, but as this substance could be separated as a constituent of the gluten it was possible to prepare it in quantity and in a state of comparative purity. Since rye flour yielded no gluten on washing with water, the proteid remaining in the meal after extracting with salt solution and dilute alcohol, could be obtained only by extracting the residual meal directly with dilute potash water. All attempts, however, to thus prepare this substance resulted only in the production of small preparations of very variable composition. The gum present in the seed dissolved freely in the alkaline solution and made it impossible by any means yet discovered to thoroughly purify the preparations. For this reason nothing positive can now be said in relation to the nature or composition of this residual proteid. Since the other proteids are the same as those found in the wheat kernel it might be conjectured that this proteid is identical with glutenin. The fact that rye flour yields no gluten is, however, opposed to such

a conclusion. It is therefore more probable that the substance in question is, partly or wholly, other than glutenin.

Quantities of the different Proteids in the Rye-Kernel.

Owing to the gum already mentioned the filtration and treatment of the rye extracts was difficult and prolonged and the amounts of globulin, albumin and proteose could not be determined separately, as in the case of wheat. The rye flour contained 1.52 per cent. of nitrogen. If we assume that the proteids of rye contain on the average 17.6 per cent. of nitrogen, as was very nearly the case with those of wheat, and that all the nitrogen exists in proteid form, this sample of flour would contain 8.63 per cent. of proteid. We have, therefore, 2.44 per cent. of insoluble proteid and 6.19 per cent. soluble in salt solution and alcohol. We have already shown that the alcohol-soluble gliadin amounted to 4.0 per cent. of the flour and the leucosin to 0.43 per cent., there thus remains 1.76 per cent. to be divided between edestin and proteoses.

Insoluble in salt solution	2.44 per cent.
Gliadin, soluble in alcohol	4.00 "
Leucosin, " " water	0.43 "
Edestin and Proteose, soluble in salt solution	1.76 "
	8.63 "

THE PROTEIDS OF BARLEY.

By Thomas B. Osborne.

The proteids of barley have received little attention on the part of chemists. Mulder* states that this grain contains six per cent. of albumin and plant gelatin; the latter was obtained by extracting barley meal with hot alcohol, cooling the resulting solution and treating the deposited substance with ether. The composition of this body he gave as follows:

	1.	2.
Carbon	54.93	54.75
Hydrogen	7.11	6.99
Nitrogen	15.71	15.71
Sulphur	0.57	0.62
Oxygen	21.68	21.93
	100.00	100.00

v. Bibra† names albumin, plant-gelatin and casein as constituents of barley but gives no particulars concerning these bodies further than that they all contain on the average 15.5 to 15.6 per cent. of nitrogen.

Kreusler made an investigation of the proteids of barley, the results of which are given by Ritthausen.‡ Kreusler employed coarsely ground meal and finely ground flour, the latter yielding purer preparations, the results being otherwise the same.

He states that the aqueous extract of the ground seed contains an albumin coagulated by boiling and of the following composition:

Carbon	52.86
Hydrogen	7.23
Nitrogen	15.75
Sulphur	1.18
Oxygen	22.98
	100.00

* Physiolog. Chemie, I, 306–308.

† Die Getreidearten u. das Brod. Nürnberg, 1860, p. 304.

‡ Die Eiweisskoerper &c., Bonn, 1872, page 103.

The extract made with hot 75-per cent. alcohol contains, according to Kreusler, three proteids; gluten-casein, gluten-fibrin and mucedin.

The gluten-casein separates on cooling the hot alcoholic extract and when purified by boiling with dilute alcohol and fractionally precipitated from solution in acetic acid has the composition stated below.

1, is not corrected for ash and represents the first precipitation from a turbid solution.

2, is the second precipitation from a clear solution and is corrected for ash.

The cold alcoholic extract contains gluten-fibrin and mucedin.

The composition of these Kreusler gives as follows:

	Gluten-casein.		Gluten-fibrin.		Mucedin.	
	1.	2.	From meal.	From flour.	From meal.	From flour.
Carbon	53.84	53.25	55.23	54.55	53.19	53.97
Hydrogen	7.16	7.13	7.24	7.27	6.65	7.03
Nitrogen	16.63		15.49	15.70	16.14	16.98
Sulphur }			22.04	22.48	24.02	0.68
Oxygen }						21.34
						100.00

These proteids were supposed to be the same as those similarly named and described by Ritthausen as occurring in the wheat kernel.

So far as the writer has been able to learn the preceding summary includes all that has been published hitherto in regard to the proteids of the barley kernel that is now worthy of notice.

My preliminary examination of barley meal showed that the seeds contain proteid matters soluble in water, in sodium chloride solutions and in alcohol, and that after complete extraction with all these reagents there remains a considerable quantity of proteid which can be partly extracted by dilute potash solutions, but the greater part of which is insoluble in any reagent hitherto applied.

The material employed consisted of meal made from two-rowed barley and of a very white barley flour kindly furnished by the Health Food Co., of New York, both of which yielded proteids of the same composition and properties, the preparations derived from the flour, however, being less contaminated with coloring matter than those derived from the meal made from the entire grain, including the ground husk, which was so closely adherent, as to render its removal in the laboratory impossible.

Proteids Soluble in Water. Leucosin. Proteose.

As an aqueous extract of any seed, is in reality a dilute saline solution, owing to the salts extracted from the seed, and as the proteid matter soluble in alcohol dissolves to a slight extent in very dilute saline solutions the proteids properly soluble in water were obtained by extracting the meal with sodium chloride solutions, dialyzing away the salts and filtering off the proteid that thereby precipitated. In this way the proteid matter, soluble in pure water, which had been extracted from the meal was obtained in solution by itself. Three kilos of barley, ground to a fine meal, were treated with nine liters of 10-per cent. salt solution, applied in successive portions, the bran being removed by washing on a coarse cloth. The starch and other suspended matter was allowed to settle out and the extract was filtered clear. This solution was then saturated with ammonium sulphate and the precipitate produced, after filtering out, was treated with 10-per cent. salt solution. The resulting liquid was filtered clear and dialyzed for five days. The globulin that separated in this process was collected on a filter, the solution was returned to the dialyzer for three days longer, and the very small additional amount of substance that separated was filtered out. The clear solution was then heated in a water bath to 65°, the water of the bath not exceeding 70°. After an hour the coagulum was filtered out, washed with warm water, alcohol and ether, and dried over sulphuric acid. This preparation, **1**, weighed 4.15 grams and when dried at 110° had the following composition :

Coagulated Barley Albumin, Leucosin. *Preparation* **1.**

Carbon	53.04
Hydrogen	6.78
Nitrogen	16.84
Sulphur	1.42
Oxygen	21.92
	100.00
Ash	0.29

Another preparation was made by treating two kilos of barley meal with 10-per cent. sodium chloride solution, squeezing out in a press and repeating the process on the residue. The filtered extract was saturated with ammonium sulphate, the precipitate dissolved in dilute salt solution, subjected to dialysis and when freed from chlorides filtered and heated to 65° in a water bath of

70°. The coagulum produced was washed thoroughly with hot water, alcohol and ether and dried over sulphuric acid. This preparation, 2, weighed 2.3 grams and when dried at 110° had the following composition:

COAGULATED BARLEY ALBUMIN, LEUCOSIN. *Preparation* 2.

Carbon	52.67
Hydrogen	6.77
Nitrogen	16.41
Sulphur } Oxygen }	24.15
	100.00
Ash	0.31

As this body separated slowly when its solutions were heated to 65° it was thought possible that more than one albumin was present, which if a fact might be shown by analysis of preparations precipitated in successive fractions.

Accordingly six kilos of barley meal were extracted with 10-per cent. salt solution and the clear filtered extract saturated with ammonium sulphate. The precipitate produced was dissolved in brine and the solution, after filtering clear, was dialyzed until all the globulin had precipitated. It was then again filtered clear and in order to obtain a concentrated solution the filtrate was saturated with ammonium sulphate, the precipitate formed was dissolved in water and this solution was filtered clear and dialyzed. After six days only a very little more globulin had separated, which was filtered out and a portion of the clear solution was tested carefully for its coagulation point. When slowly heated in a double water bath it became faintly turbid at 39° and but very little more so at 49°. The turbidity then rapidly increased, flocks appearing at 56°. After heating at 56° for twenty minutes the solution was filtered and again heated. Turbidity occurred at 50° and flocks formed at 60°. After heating to 65° and holding at this temperature for some time the solution was filtered and again heated. Thereupon the turbidity took place at 70° and a very few flocks formed at 74°. The solution still had a just detectable acid reaction. The entire solution was then heated with great care to precisely 56° in a large water bath, the temperature of which did not exceed 57°. After keeping at this temperature for an hour the coagulum was filtered out, washed with hot water, alcohol and ether and dried over sulphuric acid

This preparation, **3**, weighed 0.36 gram and contained, when dried, without correction for ash, 16.48 per cent. of nitrogen.

The filtrate from preparation, **3**, was then heated to just 60° for three hours and the second coagulum filtered off and treated as the first had been. This preparation, **4**, weighed 0.4 gram and contained, without correcting for ash, 16.74 per cent. of nitrogen. Another part of this same extract after freeing from globulin as above described was dialyzed into alcohol for three days whereby the solution was concentrated and the proteid partly precipitated. In order to separate the albumin from any proteose thrown down with it, the precipitate produced by alcohol-dialysis was digested with absolute alcohol for three days longer and then washed thoroughly with water. A considerable part of the albumin was thus rendered insoluble in water, and after being further washed with absolute alcohol and ether was dried over sulphuric acid and found to weigh 0.51 gram. This preparation, **5**, contained 16.30 per cent. of nitrogen without correcting for ash.

Another preparation of albumin was made in the same way, in order to obtain a larger quantity for complete analysis. Six kilos of barley flour were mixed with 28 liters of 10-per cent. salt solution and 17 liters of clear filtrate obtained, which was saturated with ammonium sulphate. The precipitate produced was dissolved as far as possible in 10-per cent. salt solution, filtered clear, and in order to reduce the volume of the solution it was saturated with ammonium sulphate, the precipitate dissolved in 1000 c. c. of water and dialyzed until entirely free from globulin. The solution was then filtered and dialyzed into alcohol. After being concentrated, absolute alcohol was added and the precipitate filtered off, washed with absolute alcohol and ether and dried over sulphuric acid. This preparation, **6**, weighed 4.1 grams. It was then digested with water and the insoluble matter washed thoroughly with water, alcohol and ether, dried over sulphuric acid, and had the following composition when dried at 110°:

Coagulated Barley Albumin, Leucosin. *Preparation* **6.**	
Carbon	52.71
Hydrogen	6.78
Nitrogen	16.93
Sulphur	1.51
Oxygen	22.07
	100.00
Ash	0.50

SUMMARY OF ANALYSES OF COAGULATED BARLEY ALBUMIN—LEUCOSIN.

	1.	2.	3.*	4.*	5.*†	6.†	Average.
Carbon	53.04	52.67	----	---	----	52.71	52.81
Hydrogen	6.78	6.77	----	---	----	6.78	6.78
Nitrogen	16.84	16.41	16.48	16.74	16.30	16.93	16.62
Sulphur	1.42	24.15	----	----	----	1.51	1.47
Oxygen	21.92					22.07	22.32
	100.00	100.00				100.00	100.00

If this proteid is compared with the leucosin‡ obtained from the wheat and rye kernels it will be seen that the three are almost identical in composition.

LEUCOSIN.

	Wheat.	Rye.	Barley.
Carbon	53.02	52.97	52.81
Hydrogen	6.84	6.79	6.78
Nitrogen	16.80	16.66	16.62
Sulphur	1.28	1.35	1.47
Oxygen	22.06	22.23	22.32
	100.00	100.00	100.00

The aqueous extract of the barley kernel contains also a small quantity of one or more proteoses, but owing to the great difficulties encountered in attempting to separate these no pure preparations have been obtained.

PROTEID SOLUBLE IN SODIUM CHLORIDE SOLUTION. EDESTIN.

The large amount of gum extracted from barley meal by salt solution renders it very difficult to prepare the globulin in anything like a pure state. This difficulty is further increased by the readiness with which the globulin passes into the insoluble or albuminate condition and is thus lost for further purification. In only three cases was it possible to redissolve and reprecipitate this proteid in sufficient quantity for analysis. In all the extracts made, a considerable amount of globulin was precipitated by dialysis in the form of minute spheroids. So far as noticed, this globulin resembled in all respects that found in wheat and rye. It was readily and completely precipitated from salt solution by dialysis and also by adding acid. When dissolved in 10-per cent. sodium chloride solution and heated, turbidity occurred at 90° but no

* Not corrected for ash. † Coagulated by alcohol.

‡ Report of the Conn. Agricultural Experiment Station, 1893, p. 179.

coagulum formed until the solution was boiled and then only a small part of the dissolved substance separated.

Three kilos of barley meal were extracted with 10-per cent. salt solution, the filtered extract saturated with ammonium sulphate and the resulting precipitate filtered out, dissolved in 10-per cent. brine and the insoluble matter removed by filtration after adding a *very* small quantity of two-tenths-per cent. potash water in order to neutralize the slight acid reaction of the extract. The solution was then filtered clear and dialyzed for four days. The proteid separated in the form of small spheroids which were filtered out, washed with water, alcohol and ether, and after drying over sulphuric acid found to weigh 4.02 grams. This preparation was dissolved in 10-per cent. salt solution and again submitted to dialysis. After the proteid had precipitated it was filtered out, washed with water, alcohol and ether, and the final preparation, **7**, when dried at 110°, had the following composition:

BARLEY GLOBULIN, EDESTIN, *Preparation* **7**.

Carbon	51.43
Hydrogen	6.71
Nitrogen	18.14
Sulphur, Oxygen	23.72
	100.00
Ash	0.48

Again six kilos of barley flour were extracted with 10-per cent. salt solution, the filtered extract saturated with ammonium sulphate, the resulting precipitate dissolved in salt solution and dialyzed. The precipitated globulin was again dissolved in 10-per cent. salt solution and precipitated a second time by dialysis. 1.9 grams of preparation **8** were obtained, having the following composition:

BARLEY GLOBULIN, EDESTIN, *Preparation* **8**.

Carbon	50.82
Hydrogen	6.76
Nitrogen	18.16
Sulphur, Oxygen	24.26
	100.00
Ash	0.37

Another preparation was made in the same way, save that after dissolving the ammonium sulphate precipitate in salt solution, the proteids were again precipitated by saturation with ammonium sulphate and redissolved in brine, thus yielding a solution of smaller volume which was then dialyzed. After five days' dialysis, the chlorides having been removed, the precipitated globulin was treated in the usual manner and found to weigh 1.85 grams. This preparation, **9**, had the following composition:

BARLEY GLOBULIN, EDESTIN, *Preparation* **9.**

Carbon	50.40
Hydrogen	6.48
Nitrogen	18.00
Sulphur, Oxygen	25.12
	100.00
Ash	0.44

The foregoing analyses, although not showing the agreement to be desired, are on the whole sufficiently alike to warrant their publication, and for the sake of comparison they are here tabulated.

BARLEY GLOBULIN, EDESTIN.

	7.	8.	9.	Average.
Carbon	51.43	50.82	50.40	50.88
Hydrogen	6.71	6.76	6.48	6.65
Nitrogen	18.14	18.16	18.00	18.10
Sulphur, Oxygen	23.72	24.26	25.12	24.37
	100.00	100.00	100.00	100.00

In view of the close resemblance in properties and similarity in composition it is the writer's opinion that this globulin is the same as that found in a large number of other seeds and previously described under the name edestin.* The following table affords a comparison of the composition of this proteid from its different sources.

EDESTIN.

	Wheat.	Maize.	Hemp-seed.	Castor-bean.	Squash-seed.	Flax-seed.	Cotton Seed.	Rye.	Barley.
C.	51.03	51.71	51.28	51.31	51.66	51.48	51.71	51.19	50.88
H.	6.85	6.85	6.84	6.97	6.89	6.94	6.86	6.74	6.65
N.	18.39	18.12	18.84	18.75	18.51	18.60	18.64	18.19	18.10
S.	0.69	0.86	0.87	0.76	0.88	0.81	0.62	23.88	24.37
O.	23.04	22.46	22.17	22.21	22.06	22.17	22.17		
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

* Report Conn. Agricultural Experiment Station, 1893, pp. 179 and 216.

On comparing the above analyses it will be seen that the preparations obtained from the cereals show the greatest deviation from the average of these figures. This is unquestionably due to the fact that in these seeds this substance is present in small quantity and is associated with other bodies so that it has been impossible to prepare it from them in a state of perfect purity.

Proteid soluble in Dilute Alcohol. Hordein.

After extracting 500 grams of barley meal with brine the residue was treated with alcohol added in sufficient quantity to form with the water retained by the meal, an alcohol of approximately 75-per cent. After digesting a short time the meal was squeezed out and again treated with 75-per cent. alcohol, and pressed out. The united alcoholic extracts were then filtered clear, concentrated to small volume on a water bath, cooled and the proteid thus separated washed thoroughly by kneading with distilled water. The separated substance now presented every appearance of gliadin, the proteid similarly obtained from wheat and rye. It was dissolved in a little dilute alcohol in which it was very readily soluble with the exception of a slight residue of coagulated proteid which rendered filtration extremely difficult. The solution was then precipitated by pouring into absolute alcohol and the precipitate digested with absolute alcohol, rubbed to a powder while still moist with alcohol and treated with ether. When dried over sulphuric acid this preparation, **10,** weighed 4.54 grams and when dried at 110° gave on analysis the following results:

Barley Proteid, *Preparation* **10.**

	I.	II.	Average.
Carbon	53.83	53.93	53.88
Hydrogen	6.72	6.92	6.82
Nitrogen	17.32	----	17.32
Sulphur, Oxygen	----	----	21.98
			100.00
Ash			0.22

Another extract was made by treating 500 grams of barley meal with three liters of alcohol of 0.9 specific gravity applied directly to the freshly ground meal. The extract which had a red-brown color was squeezed out in a press and concentrated to about one-eighth of its volume. After standing over night the mother

liquor was poured off from the proteid which had separated in a firm mass on the bottom of the dish.

This was then dissolved in dilute alcohol and precipitated by pouring into absolute alcohol. The resulting precipitate was washed with absolute alcohol, digested with ether, dried over sulphuric acid and found to weigh 12.3 grams. This preparation, **11,** when dried at 110°, had the following composition:

BARLEY PROTEID, *Preparation* **11.**

Carbon	53.78
Hydrogen	6.51
Nitrogen	17.27
Sulphur	0.95
Oxygen	21.49
	100.00
Ash	0.19

The remainder of preparation **11** was then dissolved in dilute alcohol and, after filtering clear, poured into distilled water and precipitated by adding a few drops of sodium chloride solution. This substance was again dissolved in dilute alcohol and precipitated by pouring into absolute alcohol. After treating with ether and drying at 110°, this preparation, **12,** was analyzed with the following results:

BARLEY PROTEID, *Preparation* **12.**

Carbon	53.78
Hydrogen	6.82
Nitrogen	17.16
Sulphur	0.93
Oxygen	21.31
	100.00
Ash	0.86

Three kilos of barley meal were treated with 10-per cent. salt solution and washed on a coarse cloth until only the bran and larger particles of meal remained. This residue was then extracted with alcohol of 0.9 sp. gr. yielding a deep red solution, which was filtered through animal charcoal, but only a part of the coloring matter was removed. The clear solution was next concentrated on a water bath, poured into absolute alcohol and the resulting precipitate digested with absolute alcohol and treated with ether, giving preparation **13,** weighing 30 grams and when dry having the following composition:

BARLEY PROTEID, *Preparation* **13.**

	I.	II.	Average.
Carbon	53.80	53.70	53.75
Hydrogen	----	6.78	6.78
Nitrogen	17.48	17.33	17.41
Sulphur	0.93	----	0.93
Oxygen	----	----	21.13
			100.00
Ash			0.25

A portion of the solution from which preparation **13** had been obtained was precipitated separately by pouring into strong alcohol and adding a few drops of salt solution. The precipitate was treated in the usual manner and gave a preparation, **14**, containing much less coloring matter than the preceding and having the following composition:

BARLEY PROTEID, *Preparation* **14.**

Carbon	54.32
Hydrogen	6.74
Nitrogen	17.13
Sulphur } Oxygen }	21.81
	100.00
Ash	1.43

The starchy portion of the barley meal which had been washed through the cloth, as described, was thoroughly extracted with salt solution and then with dilute alcohol, the extraction being repeated until the proteid was completely removed. The united extracts were filtered and concentrated to two-thirds of their volume by distillation when the solution was poured into a dish and the evaporation continued. The proteid separated as a skin on the surface of the liquid and as a solid mass on the bottom of the dish. When reduced to about one-half the volume of the original liquid the hot mother liquor was decanted from the separated proteid which formed a tough mass of a pink color. This was washed with water and redissolved in dilute alcohol, giving a deep red solution which was poured into absolute alcohol and the mass of substance that separated was cut up with scissors into small pieces and digested with absolute alcohol and with ether. When dried over sulphuric acid this preparation, **15**, was pinkish in color and weighed 30 grams. Dried at 110° and analyzed the following results were obtained:

BARLEY PROTEID, *Preparation* **15.**

Carbon	54.00
Hydrogen	6.72
Nitrogen	17.49
Sulphur, Oxygen	21.79
	100.00
Ash	0.95

The mother liquor, decanted from preparation **15,** was still further concentrated and allowed to cool over night. Only a little substance separated which however was washed with water, redissolved in dilute alcohol and precipitated by pouring into much distilled water to which a little salt had been added. On standing about 36 hours the milky solution cleared and the proteid was found in a transparent layer at the bottom of the vessel. After treating with absolute alcohol and ether and drying over sulphuric acid, preparation **16** was obtained weighing 7 grams and having when dried, the following composition:

BARLEY PROTEID. *Preparation* **16.**

Carbon	53.90
Hydrogen	6.63
Nitrogen	17.08
Oxygen, Sulphur	22.39
	100.00
Ash	0.23

As this proteid resembled gliadin so closely in its physical and chemical properties it seemed important to subject it to very thorough fractional precipitation in order to determine whether it was a mixture of gliadin with another body or a new, distinct proteid. Another extract was made by treating three kilos of freshly ground barley meal with 10-per cent. salt solution, squeezing out in a press and treating the residue again in the same way. The meal residue was then mixed with alcohol in quantity sufficient to make with the water retained by the meal an alcohol of about 40-per cent. After squeezing out the liquid, alcohol was again added to the residual meal sufficient to increase the strength of the solvent to 75-per cent. After digesting for some time the extract was squeezed out and found less colored than the first dilute alcohol extract. This second extract was concentrated by

distillation to small volume and cooled giving a deposit of proteid much whiter than any previously made. The mother liquor from this precipitate was poured into absolute alcohol and a second precipitate obtained. The two precipitates, when united, dehydrated in the usual way, treated with ether, and dried over sulphuric acid weighed 22 grams. Dried at 110° this substance had the following composition:

BARLEY PROTEID. *Preparation* **17.**

Carbon	54.30
Hydrogen	6.67
Nitrogen	17.47
Sulphur	0.84
Oxygen	20.72
	100.00

About 18 grams of this preparation were dissolved in alcohol of 0.9 specific gravity and absolute alcohol was added until a considerable precipitate resulted, when the mixture was heated on a water bath until the precipitate dissolved. The solution was then cooled and after standing sometime the mother liquor was decanted from the separated substance. This precipitate was marked I. The solution decanted from I, was further treated with absolute alcohol and a second precipitate II, obtained in the same way. The mother liquor from II was mixed with a large quantity of absolute alcohol and, as the proteid did not separate, a few drops of salt solution were added and the resulting precipitate III filtered off and treated with absolute alcohol and ether in the usual manner.

In the first place, precipitate I was dissolved in a small quantity of 75-per cent. alcohol and absolute alcohol was added until the precipitate began to reappear. The whole was heated until this precipitate again dissolved whereupon the solution was cooled. The substance which separated settled out leaving the solution milky. The mother liquor was decanted from the small amount of deeply colored proteid which adhered to the bottom of the beaker, and this deposit was dissolved in a little 75-per cent. alcohol, treated with absolute alcoho and the opalescent solution so produced mixed with a little ether. This gave a very small precipitate, almost black in color and very sticky. The solution decanted from this small deposit was treated with a drop of potassium acetate solution

and the resulting precipitate after washing with absolute alcohol and ether was dried over sulphuric acid. It formed a light pink powder, preparation **18**, weighing 0.65 gram and when dry contained, ash free, 16.60 per cent. of nitrogen. Its ash content was 1.04 per cent. The mother liquor, decanted from the first precipitation of **18**, was treated with a drop of potassium acetate solution and the precipitate produced allowed to settle. After standing, the substance settled out and adhered to the bottom of the beaker in a solid mass, from which the clear supernatant solution was decanted. This solution after treatment with absolute alcohol yielded a precipitate which, washed with absolute alcohol and ether and dried, formed preparation **19** weighing 1.79 grams and having the following composition :

BARLEY PROTEID. *Preparation* **19.**

Carbon	53.85
Hydrogen	6.69
Nitrogen	17.22
Sulphur, Oxygen	22.24
	100.00
Ash	0.40

The substance deposited after the addition of potassium acetate to the solution from which **19** was derived, was dissolved in 75-per cent. alcohol, absolute alcohol added to the solution and the resulting precipitate dissolved by heating. On cooling, a part of the proteid separated and after this had settled, the liquid was decanted and mixed with absolute alcohol, and on treating the precipitate in the usual manner preparation **20** was obtained, which when dried weighed 1.18 gram and gave the following results on analysis :

BARLEY PROTEID. *Preparation* **20.**

Carbon	54.33
Hydrogen	6.81
Nitrogen	16.93
Sulphur, Oxygen	21.93
	100.00
Ash	0.58

The substance deposited by cooling the solution from which **20** was obtained was only partly soluble in dilute alcohol. It was

accordingly treated with 75-per cent. alcohol and allowed to stand until the insoluble matter had settled out. The clear liquid was then decanted and completely precipitated with absolute alcohol. The separated substance was washed with absolute alcohol and ether and when dry weighed 0.81 gram. This preparation, **21**, contained ash-free, 16.65 per cent. of nitrogen and 0.32 per cent. of ash. The insoluble matter just described, after washing by decantation with 75-per cent. alcohol, was treated in the usual manner and yielded preparation **22**, weighing 1.56 gram and having the following composition:

BARLEY PROTEID. *Preparation* **22**.

Carbon	53.91
Hydrogen	6.77
Nitrogen	17.00
Sulphur } Oxygen }	22.32
	100.00
Ash	0.71

Precipitate II was dissolved in a little 75-per cent. alcohol and the solution mixed with absolute alcohol. The resulting precipitate (*a*) was dissolved by heating and the solution cooled, whereupon a part (*b*) of the proteid was precipitated. The supernatant solution was poured off, mixed with absolute alcohol and this precipitate (*c*) which contained all the proteid remaining was dehydrated with absolute alcohol and washed with ether, giving preparation **23**, weighing 2.2 grams and having when dry the following composition:

BARLEY PROTEID. *Preparation* **23**.

	I.	II.	Average.
Carbon	54.63	54.68	54.65
Hydrogen	6.62	6.50	6.56
Nitrogen	17.16	----	17.16
Sulphur } Oxygen }	----	----	21.63
			100.00
Ash			0.32

The substance (*b*) deposited on cooling the solution as above described, was dissolved in 75-per cent. alcohol and partly precipitated by adding absolute alcohol. After redissolving the precipitate by the application of heat, the solution was cooled and

allowed to stand some time to deposit the precipitate which formed. The liquid was then decanted and the separated substance treated with absolute alcohol and ether, yielding preparation **24**, weighing 3.11 grams and having the following composition after drying at 110°.

BARLEY PROTEID. *Preparation* **24.**

Carbon	54.27
Hydrogen	6.67
Nitrogen	17.39
Sulphur } Oxygen }	21.67
	100.00
Ash	0.32

To the solution from which **24** separated absolute alcohol was added in considerable quantity and the proteid thus thrown down was dehydrated with absolute alcohol and washed with ether. When dried this preparation, **25**, weighed 0.87 gram and, without correction for ash contained 17.28 per cent. of nitrogen.

Precipitate III was treated with absolute alcohol and with ether, and dried over sulphuric acid. It weighed 1.63 grams and its composition after complete drying was :

BARLEY PROTEID. *Preparation* **26.**

Carbon	53.39
Hydrogen	7.02
Nitrogen	17.49
Sulphur } Oxygen }	22.10
	100.00
Ash	0.59

If these figures are compared it will be seen that no fractional separation has been effected, the variation in the results being no greater than in the preparations previously described. Preparation **18** is low in nitrogen, but this is doubtless due to its containing nearly all the impurities precipitable from the solution. Preparation **21** is also low in nitrogen but this was the most colored of all the preparations and as it was also small in quantity the accuracy of the analysis could not be confirmed. Excluding these two preparations the results agree fairly as shown by the following table.

SUMMARY OF THE PRECEDING FRACTIONAL PRECIPITATES.

	19.	20.	22.	23.	24.	25.	26.	Original substance 17
Carbon	53.85	54.33	53.91	54.65	54.27	....	53.39	54.30
Hydrogen	6.69	6.81	6.77	6.56	6.67	....	7.02	6.67
Nitrogen	17.22	16.93	17.00	17.16	17.39	17.28	17.49	17.47
Sulphur } Oxygen }	22.24	21.93	22.32	21.63	21.67	....	22.10	21.56
	100.00	100.00	100.00	100.00	100.00		100.00	100.00
Weight	1.79	1.18	1.56	2.2	3.11	0.87	1.63	18.00

As all the preceding preparations were made by extracting barley meal which contained a large quantity of bran, they were much contaminated with coloring matter.

In order to obtain products free from color 880 grams of fine ground "pearled barley" (a commercial preparation of barley made by rubbing off the outer coat of the grain), were treated with salt solution and after squeezing out the excess of liquid the residue was digested with 75-per cent. alcohol. The extract was then filtered, concentrated to small volume, cooled and the mother liquor decanted from the separated proteid. This was then dissolved in dilute alcohol, the solution poured into distilled water and the proteid thrown down by adding a little salt. The precipitate was again dissolved in a small amount of dilute alcohol and reprecipitated by pouring into absolute alcohol, digested with absolute alcohol for some time, then with ether, dried over sulphuric acid and found to weigh 8 grams. This preparation, **27**, was pure white and had the following composition when thoroughly dried:

BARLEY PROTEID, *Preparation* **27**.

Carbon	54.37
Hydrogen	6.81
Nitrogen	17.33
Sulphur	0.88
Oxygen	20.61
	100.00
Ash	0.48

Another preparation was made by extracting six kilos of barley flour with salt solution and then treating the residue with alcohol added in sufficient quantity to make with the water of the brine which still adhered to the meal as nearly as possible 75-per cent. alcohol. After standing over night the extract was filtered off,

concentrated to about one-third its original volume and cooled slightly. The proteid that now separated out from the hot solution was removed from the liquid, rinsed with water, dissolved in a very little dilute alcohol to a thick syrup, and reprecipitated by pouring into absolute alcohol. The substance was then cut up into small pieces and digested with absolute alcohol and also with ether. When dried over sulphuric acid 78 grams of a pure white preparation were obtained. Twenty-five grams of this were then dissolved in 75-per cent. alcohol and the clear solution poured into a large volume of distilled water. A part of the substance separated, leaving the liquid milky. The milky solution was decanted from the separated substance and the latter was washed with water in which some of it dissolved. The turbid liquid and washings were united and precipitated with a little salt solution. After standing over night the proteid separated as a transparent viscid liquid on the bottom of the vessel in the same way as gliadin does under similar conditions. After decanting the supernatant liquid the deposit was dissolved in dilute alcohol and precipitated by pouring its solution into absolute alcohol. The separated proteid was then digested with absolute alcohol and with ether and dried over sulphuric acid. A pure white preparation, **28**, resulted, which when dried at 110° had the following composition:

BARLEY PROTEID, *Preparation* **28**.

Carbon	54.02
Hydrogen	6.79
Nitrogen	17.38
Sulphur	0.84
Oxygen	20.97
	100.00
Ash	1.00

The mass which separated on pouring the alcoholic solution into water, as above described, was dissolved in 75-per cent. alcohol and, as it contained a little insoluble proteid which rendered filtration impossible, the solution was allowed to stand over night. The clear supernatant solution was then poured off and concentrated to about one-third of its volume and cooled. The proteid which separated was again dissolved in dilute alcohol and precipitated by pouring into absolute alcohol. After thorough dehydration with absolute alcohol and digestion with ether the sub-

stance was dried over sulphuric acid and yielded preparation **29**, which was white in color and weighed 5.46 grams. This substance when dried had the following composition:

BARLEY PROTEID, *Preparation* **29.**

	I.	II.	Average.
Carbon	54.48	54.54	54.51
Hydrogen	6.70	6.79	6.75
Nitrogen	17.22	17.18	17.20
Sulphur } Oxygen }	21.60	21.49	21.54
	100.00	100.00	100.00
Ash			0.32

Another preparation was made without heating, by pouring a part of the original extract from which preparations **28** and **29** were derived into a large amount of distilled water and allowing the separated substance to deposit. After some time this settled and the supernatant liquid was poured off, the precipitate washed with water, dissolved in cold dilute alcohol and the solution poured into absolute alcohol. The precipitate produced was digested with absolute alcohol and then with ether and dried over sulphuric acid yielding a pure white preparation having when dry the following composition:

BARLEY PROTEID, *Preparation* **30.**

Carbon	54.23
Hydrogen	6.83
Nitrogen	17.27
Sulphur	0.75
Oxygen	20.92
	100.00
Ash	0.17

In order to obtain a larger quantity of a colorless preparation, five kilos of barley flour were treated with 10.5 liters of 75-per cent. alcohol and after standing some time the extract was filtered off and 6 liters of clear solution obtained. This was then concentrated to one-third its volume and rapidly cooled. The proteid separated as a bulky plastic mass, which, after decanting the mother liquor, was macerated with about 500 c. c. of distilled water, the washings were poured off and the mass of proteid dissolved in 500 c. c. of 75-per cent. alcohol, yielding a solution of a pale yellowish brown tint. This solution was poured in a thin stream

into a quantity of distilled water and the separated proteid, after removal from the liquid, was again dissolved in 75-per cent. alcohol and the perfectly clear solution poured in a small stream into a large quantity of absolute alcohol. As the soluble salts had been almost completely removed the proteid did not separate even after admixture of 800 c. c. of absolute ether. Three or four c. c. of salt solution were therefore added to the milky liquid and an immediate precipitate resulted which rapidly settled leaving the solution clear and free from proteid. This mixture of absolute alcohol and ether retained all the fat present in the proteid before precipitation and also some coloring matter, the liquid being yellow. The solution was decanted and the voluminous precipitate treated with successive portions of absolute alcohol and obtained as a snow white granular substance, weighing when dried over sulphuric acid 93 grams. This preparation, **31,** had the following composition when dried at 110°:

BARLEY PROTEID. *Preparation* **31.**

	I.	II.	Average.
Carbon	54.18	54.31	54.25
Hydrogen	6.98	6.65	6.82
Nitrogen	17.20	17.30	17.25
Sulphur	0.84	....	0.84
Oxygen	....	....	20.84
			100.00
Ash	....	....	0.09

In order to make certain that this proteid, which so closely resembled gliadin in every respect but composition, was not that substance contaminated with fat, a portion of this preparation was ground to a very fine powder and washed for a long time with hot ether in an extraction apparatus. Only a trace of substance was removed by this treatment and the proteid after drying had the same composition as before as the following figures show:

BARLEY PROTEID. *Preparation* **32.**

Carbon	54.20
Hydrogen	6.58
Nitrogen	17.07
Sulphur	0.91
Oxygen	21.24
	100.00
Ash	0.25

Another portion of **31** was dissolved in two-tenths per cent. potash water yielding a clear solution which was precipitated by neutralization with two-tenths per cent. hydrochloric acid. The precipitate was washed with water, dehydrated with absolute alcohol, washed with ether and analyzed with the following results:

BARLEY PROTEID. *Preparation* **33.**

Carbon	54.21
Hydrogen	6.87
Nitrogen	17.12
Sulphur	0.76
Oxygen	21.04
	100.00
Ash	0.25

Preparation **31** was then subjected to fractional precipitation in order to make sure that it was not a mixture of two or more proteids. Twenty-five grams were dissolved in 300 c. c. of alcohol of 0.865 specific gravity by heating on a water bath and the solution was quickly cooled. After adding a few drops of 10-per cent. salt solution the most of the proteid separated in a coherent mass leaving the liquid clear. After decantation the residue was treated in the same way again, the decanted solutions being united. The residue was again dissolved and absolute alcohol added to the hot solution until a considerable precipitate resulted, when it was heated until clear and then cooled. A few drops of salt solution were then added and the proteid precipitated leaving the solution slightly milky. This liquid was joined to the two solutions from which the proteid had been previously separated and a little more salt solution added to the mixture thereby precipitating the remainder of the dissolved proteid. After decanting the liquid from the separated substance the latter was treated with absolute alcohol and gave preparation **34**, representing the fraction soluble in the strongest alcohol and having when dry the following composition:

BARLEY PROTEID. *Preparation* **34.**

Carbon	54.32
Hydrogen	6.78
Nitrogen	17.02
Sulphur	0.94
Oxygen	20.94
	100.00
Ash	0.21

The proteid which had been precipitated during the preparation of this substance as just described was dissolved in alcohol of 0.865 specific gravity and the solution cooled rapidly by immersing in cold water. When a part of the substance had separated the solution was decanted and the separated substance treated with absolute alcohol. Preparation **35** was thus obtained which gave the following figures on analysis:

BARLEY PROTEID. *Preparation* **35.**

Carbon	54.47
Hydrogen	7.01
Nitrogen	17.15
Sulphur	0.74
Oxygen	20.63
	100.00
Ash	0.43

The above preparation represented the portion least soluble in strong alcohol. The solution decanted from this preparation was precipitated with absolute alcohol and a few drops of salt solution and the resulting precipitate after the usual treatment yielded preparation **36** having the following composition:

BARLEY PROTEID. *Preparation* **36.**

Carbon	54.37
Hydrogen	6.81
Nitrogen	17.30
Sulphur	0.84
Oxygen	20.68
	100.00
Ash	0.38

The following table includes all analyses of the preparations which were free from coloring matter. (See also the next page.)

HORDEIN. BARLEY PROTEID SOLUBLE IN DILUTE ALCOHOL.

	27.	**28.**	**29.**	**30.**	**31.**	**32.**
Carbon	54.37	54.02	54.51	54.23	54.25	54.20
Hydrogen	6.81	6.79	6.75	6.83	6.82	6.58
Nitrogen	17.33	17.38	17.20	17.27	17.25	17.07
Sulphur	0.88	0.84	21.54	0.75	0.84	0.91
Oxygen	20.61	20.97		20.92	20.84	21.24
	100.00	100.00	100.00	100.00	100.00	100.00

	33.	34.	35.	36.	Average.
Carbon	54.21	54.32	54.47	54.37	54.29
Hydrogen	6.87	6.78	7.01	6.81	6.80
Nitrogen	17.12	17.02	17.15	17.30	17.21
Sulphur	0.76	0.94	0.74	0.84	0.83
Oxygen	21.04	20.94	20.63	20.68	20.87
	100.00	100.00	100.00	100.00	100.00

This body differs essentially from all the well defined plant-proteids now known. As it appears to be characteristic of barley, I propose to adopt for it the latterly disused name *hordein*, which was first applied about 1820 by Proust* and ten years later by Hermbstädt † to certain products of their attempts to isolate the proximate principles of this cereal.

Hordein appears to have been obtained nearly pure from barley flour by Kreusler, as shown by the following comparison of his analysis with the average above given.

BARLEY PROTEID SOLUBLE IN DILUTE ALCOHOL.

	Kreusler.	Osborne.
Carbon	53.97	54.29
Hydrogen	7.03	6.80
Nitrogen	16.98	17.21
Sulphur	0.68	0.83
Oxygen	21.34	20.87
	100.00	100.00

Ritthausen regarded this proteid as identical with the mucedin believed by him to occur in wheat and rye, but which, as my investigations prove, does not exist in those grains.

Toward water my different preparations of hordein behave somewhat differently. Preparations dried over sulphuric acid and still retaining a little alcohol dissolve in cold water to a greater or less extent according to the amount of alcohol present. When dried completely at 110°, so that all the alcohol is removed, very little hordein dissolves in cold water and slightly more on raising the temperature. Solutions thus made with hot water do not precipitate on cooling or coagulate on boiling although they give no inconsiderable precipitates on adding salt. A large number of preparations of this proteid and of wheat gliadin were thus tested and compared under similar conditions. The gliadin

* Ann. Chim. phys., V, 337.

† Jour. of Techn. Chem., XII, 46.

showed variations in solubility in the same way as the barley proteids, but throughout was much more soluble than the latter, yielding solutions with warm water which were precipitated by cooling. As drying at 110° tends to render more or less of these proteids insoluble in 75-per cent. alcohol it is not possible to say definitely whether the difference was due to original difference in properties of the two proteids tested or to the drying. It is the opinion of the writer that the hordein of barley is decidedly less soluble in water than the gliadin of wheat.

Toward alcohol the hordein behaves, so far as could be detected, exactly like gliadin. In very dilute acids and alkalies it is readily soluble and is precipitated by neutralization. Dissolved in concentrated hydrochloric acid a beautiful crimson color is produced similar to that given by gliadin under like conditions. With a warm mixture of equal volumes of water and concentrated sulphuric acid a red color is given by hordein, not a purple red as by gliadin.

The most marked difference between hordein and gliadin is in composition, since hordein contains one and a half per cent. more carbon, one-half per cent. less nitrogen, and three-tenths per cent. less sulphur than gliadin.

In the extraction last described, 5000 grams of barley flour were treated with 10.5 liters of alcohol, and the extract obtained measured 6 liters, which was equivalent to 57.1 per cent. of the whole solution employed. If we assume, as is very nearly true, that this was equal to a complete extraction of 57.1 per cent. of the flour, the proteid obtained was equivalent to all the alcohol soluble proteid contained in 2855 grams of flour. In addition to the 93 grams of proteid above described, there was obtained a further quantity weighing when thoroughly dried over sulphuric acid 17.5 grams, thus making in all 110.5 grams. This quantity is 3.87 per cent. of the 2855 grams extracted. In order to confirm these figures 500 grams of barley flour were extracted with 2 liters of hot 75-per cent. alcohol, squeezed out in a press and the residual meal treated again in the same way with another liter of alcohol and the united extracts filtered clear and concentrated by evaporation. All the proteid contained in the solution separated on cooling and was washed with ether, then dehydrated with absolute alcohol, again digested with ether and dried completely over sulphuric acid. 20.2 grams of proteid were thus obtained equal to 4.04 per cent. of the flour. We may therefore assume that this barley flour contained about 4 per cent. of the alcohol-soluble proteid, hordein.

Proteid insoluble in Water, Saline Solutions and Alcohol.

The proteids thus far described form only a part of the total proteids of the seed. One hundred grams of barley flour were extracted, first, with a large excess of 5-per cent. salt solution and then, repeatedly, with hot 75-per cent. alcohol. The residue, washed with absolute alcohol and thoroughly air dried, weighed 71 grams and contained 1.07 per cent. of nitrogen. The air dry flour before extraction contained 1.83 per cent. of nitrogen. The 100 grams of flour therefore contained 1.83 grams of nitrogen and the residue after extraction contained 0.76 grams. The nitrogen removed by the solvents therefore amounted to 58.3 per cent. of the whole.

If we assume that the nitrogen all belonged to proteid matter containing 17 per cent. of nitrogen, the flour included 10.76 per cent. of proteids, of which 58.3 per cent. was soluble in the reagents used in extracting the proteids already described. We have therefore $10.76-6.28=4.48$ per cent. of proteid unextracted. It was only possible to obtain this proteid by treating the residue with potash water. All attempts, however, to thus prepare it in quantity sufficient to yield preparations of even approximate purity resulted in complete failure.

The previous extraction of the flour to remove the proteids already described seemed to render to a great extent the remaining proteid insoluble in potash water and only insignificant precipitates resulted on neutralizing the extracts. The barley flour also contained a large quantity of gum which rendered the filtration of the alkaline extract very difficult, as this gum dissolved freely in potash water. As the proteids prepared from the barley flour are all so similar to those obtained from wheat flour it is most probable that this seed also contains a considerable quantity of proteid soluble only in dilute alkaline solutions, but, as in the case of rye, the writer was unable to obtain results of any value whatever in regard to it.

Conclusion.

The barley kernel contains:

I. Leucosin coagulating at 52°, which is the same as the albumin found in the wheat and rye kernels. Its composition, as shown by the average of six analyses, is:

Carbon	52.81
Hydrogen	6.78
Nitrogen	16.62
Sulphur	1.47
Oxygen	22.32
	100.00

This substance forms about 0.3 per cent. of the seed.

II. A small quantity of proteose, the reactions and composition of which could not be definitely ascertained.

III. Edestin, a globulin which is the same as that found in the wheat and rye kernels and in a large number of other seeds. Its composition is approximately shown by the figures given below. Owing to the small amount of this body and the difficulty in preparing it, no perfectly pure preparations were obtained.

Carbon	50.88
Hydrogen	6.65
Nitrogen	18.10
Sulphur, Oxygen	24.37
	100.00

This is the proteid commonly known as vegetable vitellin. It is precipitated from saline solutions by dilution and by dialysis, is not coagulated by heating below 90°, and above that temperature only partially. It is not precipitated by saturating its solutions with sodium chloride, but is thrown down from saline solutions by adding acid.

IV. Hordein, a proteid insoluble in saline solutions, very slightly soluble in pure water and extremely soluble in alcohol of about 75-per cent. This is the barley-proteid described by Ritthausen as mucedin. It has almost exactly the same physical and chemical properties as gliadin obtained from wheat and rye kernels but a different composition.

Carbon	54.29
Hydrogen	6.80
Nitrogen	17.21
Sulphur	0.83
Oxygen	20.87
	100.00

About 4.0 per cent. of the seed consists of this substance.

V. After extracting the barley flour with salt solution and with alcohol the residue still contained 42 per cent. of the total nitrogen, corresponding to proteid matter equal to about 4.5 per cent. of the flour. It was not possible to extract more than a very small amount of this residual proteid with dilute potash water, as the treatment for removal of the other proteids rendered it insoluble, if it were not so already.

VI. The barley flour contained 1.83 per cent. of nitrogen and, if it is assumed that this all belonged to proteid matter with 17 per cent. of nitrogen, the flour would contain 10.75 per cent. of proteids. The barley accordingly contained about 4.5 per cent. of insoluble proteid, 4.0 per cent. of hordein soluble in dilute alcohol, 0.30 per cent. albumin and 1.95 per cent. of globulin and proteose.

THE CHEMICAL NATURE OF DIASTASE.

By Thomas B. Osborne.

Few substances are of more importance or of more interest than the enzymes or unorganized ferments, yet our knowledge relating to these bodies is almost wholly confined to the products of their activity and the conditions under which this is manifested. Although the existence of these ferments was recognized early in the present century, our information in respect to their true nature is exceedingly limited and unsatisfactory. It was for a long time supposed that the active substance causing a fermentative change is a soluble proteid, and the power of inducing such change seems by many to have been ascribed to soluble proteid matter in general. Later, this power was thought to be restricted to special forms of proteid, but no sufficient evidence was brought forward. Of late years investigators have undertaken to isolate ferments and prepare them in a state of purity. The results of these attempts have led to very conflicting conclusions respecting the character of these bodies. Some of the so-called pure preparations of ferments have had the properties of the proteids, and have more or less agreed with them in composition, while others have differed widely from the proteids in both respects.

It still seems to be the opinion of many that the enzymes are in fact true proteids and that the ferments thus far supposed to be obtained in a state of purity were simply somewhat contaminated with other substances. This opinion is based on the fact that all those changes which are ascribed to the action of enzymes occur only in solutions which contain proteid matter, and that the activity of the ferment is greatly influenced by conditions known to have a pronounced action on proteids, such as heat, the presence of acids and alkalies, salts of the heavy metals, etc.

The first discovered and one of the most carefully studied of these ferments is diastase. The practical application of the action of diastase in the manufacture of alcohol and of malt liquors has given rise to careful and extended studies of the conditions affecting the activity of this ferment, and the result of these studies has led some to the opinion that the active substance is the albumin present in the malt extracts. The conversion of

starch into maltose and dextrin by diastase increases in rate and extent as the temperature of the solution is raised, until the heat reaches the point at which the albumin begins to coagulate. The ferment then begins to lose power, and, when the heat is sufficient to completely coagulate the albumin, its amylolytic action ceases entirely. In 1883, C. Lintner, Jr., showed that the diastatic power of fifteen different samples of malt was very nearly proportional to the amount of coagulable albumin which they contained. In 1886, however, C. J. Lintner prepared diastase in, as he supposed, a state of purity, and came to the conclusion that the results of his analysis of diastase indicate that, in the ferments, we have a special class of proteid substances. The composition of Lintner's purest diastase differed much from that of the proteids, since it contained only two-thirds as much nitrogen and also less carbon. His diastase furthermore, failed to give the reaction with cupric sulphate and potassic hydrate which is characteristic of proteid matter. These results of Lintner's threw much doubt on the hypothesis that the vegetable albumin is identical with diastase.

In my investigations of the proteids of wheat, rye and barley, I found in all these grains the same albumin and was impressed with the close relation between the temperature at which this albumin coagulates and the temperature at which diastase begins to lose its activity. The aqueous extracts of these seeds, as is well known, possess considerable diastatic power, and it seemed to be more than probable that this was due to the albumin. I accordingly undertook an investigation of this subject, and I now offer the results thus far obtained, which are preliminary to a more extended study.

The usual method of preparing vegetable enzymes is to treat the aqueous or glycerin extract containing them with alcohol as long as a precipitate, having fermentative power appears, to purify this by repeated precipitation from its solution in water, by means of alcohol, and finally to subject the aqueous solution to dialysis to remove salts. This method is wholly unsuited to yield pure preparations, because the precipitate produced by alcohol contains not only a large amount of carbohydrates and salts, but also nearly all of the various forms of proteid matter present in the extract. Lintner employed this method, and there can be no doubt that he obtained a mixture of proteids with other substances which defied all attempts at further separation.

The most rational method (hitherto very little used) is first to separate the proteids from the carbohydrates and other soluble substances by saturating the extract with ammonium sulphate, thereby precipitating the ferment and proteids together, next to remove the proteid existing as globulin, by dialysis, and then, if possible, to separate the albumin and proteoses by fractional precipitation with alcohol. In following this method, a measured quantity of malt extract was saturated with ammonium sulphate, the precipitated proteid matter was filtered out, dissolved in water, and the clear filtered solution made up to the volume of the original extract. This solution was found to have the same diastatic power as before precipitation, thus showing that ammonium sulphate had not injured the diastase. Throughout my work diastatic power has been measured by Lintner's method, which gives a very ready means of accurately comparing different preparations. This method consists in adding to each of a series of carefully measured volumes of the solution containing definite amounts of the diastatic preparation, ten c. c. of a two per cent. solution of soluble potato starch, and allowing the ferment to act upon the starch for one hour at the ordinary temperature of the room. At the end of this time five c. c. of Fehling's solution are added to each portion and the mixtures are heated for ten minutes in a boiling water bath. After the precipitated cuprous oxide has settled, where too little sugar has been formed to precipitate all the copper, the liquids will be blue; if sugar is in excess they will be yellow. The one colorless liquid that should result gives the measure of diastatic power. Lintner represented the value of his most active preparation by 100, and that of the other preparations by figures stating the amount of each necessary to give a complete reaction with Fehling's solution under the above conditions, in comparison with his most active preparation, of which, under the conditions of the test just described, twelve one-hundredths of a milligram completely reduced the five c. c. of Fehling's solution.

For the sake of comparison I have measured the activity of my preparations by the same standard, so that a preparation whose activity is given as 200 means that six one-hundredths of a milligram sufficed to give a complete reduction.

As Lintner recommended extracting the malt with water containing twenty per cent. of alcohol instead of pure water, since thereby less foreign matter was removed with the proteid, this

procedure was first tried. Fifteen hundred grams of ground air-dried malt, prepared in the laboratory, were treated with three liters of twenty per cent. alcohol, the extract squeezed out in a press and the residue again treated with another liter of the same dilute alcohol. Three liters of extract were obtained which after being filtered clear were saturated with ammonium sulphate. Owing to the presence of the alcohol much less ammonium sulphate was dissolved than by a water extract, and the proteids were consequently incompletely precipitated. The precipitate obtained was treated with water and a considerable quantity of insoluble matter, consisting mostly of globulin rendered insoluble by contact with the reagents, was filtered out. The solution was saturated with ammonium sulphate, and the precipitate dissolved in water. This clear solution was then dialyzed in water for some days, and after filtering from a slight deposit was dialyzed in alcohol of 0.845 sp. gr. for 48 hours.

As the water passed out of the dialyzer faster than the alcohol entered, the solution became concentrated and a considerable precipitate formed. This was filtered out and washed, first with dilute alcohol and afterwards with absolute alcohol, and dried over sulphuric acid. This preparation, **1**, when thus dried, dissolved in water with the exception of a not inconsiderable residue. When filtered clear, the solution, on heating, gave an abundant coagulum, and after boiling and filtering out the coagulum, the filtrate gave a strong pink color with cupric sulphate and potassic hydrate, showing the presence of proteose. The diastatic power of this preparation, in comparison with Lintner's best was 86, but, as it was afterward found to contain a comparatively small amount of ash, the test was repeated with the addition of a few milligrams of sodium chloride and then found to equal 150.

The composition of preparation **1** was as follows:

PREPARATION **1**.

	Ash-free.
Carbon	52.55
Hydrogen	6.48
Nitrogen	16.41
Sulphur } Oxygen }	24.56
	100.00
Ash	2.29

These figures indicate that this preparation consisted almost wholly of proteid matter, and the reactions proved the presence

of at least three forms, namely, coagulated proteid, albumin and proteose. This mixture was one and a half times more active than Lintner's most energetic preparation, and contained about six per cent. more nitrogen and one-half as much ash. The composition of the preparation is very similar to that of the coagulated albumin-like body obtained from wheat, rye and barley, and for which I have adopted the name leucosin. As this albumin has been found to have the same composition, whether coagulated by heat or by alcohol, and as most, if not all of the proteids have identical composition (so far as analysis can show), in the soluble and the coagulated states, it seems probable that preparation **1** consisted mostly of coagulated and soluble leucosin together with a little proteose.

The filtrate from this preparation on addition of absolute alcohol, yielded a small precipitate **2** which dissolved wholly in water and gave only a very slight coagulum on heating, but a strong pink biuret reaction, showing it to be mostly proteose. Its diastatic power was only 19.

As above stated, owing to the presence of alcohol, saturation of the original extract of malt with ammonium sulphate, precipitated only a part of the proteids. Accordingly the filtrate from this first precipitation was dialyzed for 24 hours, so as to remove most of the alcohol, and was again saturated with ammonium sulphate. The resulting precipitate was dissolved in water, filtered from a slight residue, and the clear solution dialyzed until nearly all the ammonium sulphate was removed. The dialyzer was then transferred to alcohol and left for 48 hours. The resulting precipitate was then filtered out and treated in the manner before described. After drying, this substance, preparation **3**, like preparation **1**, consisted of insoluble proteid, soluble leucosin and proteose. Its diastatic power was 133, and it had the following composition :

PREPARATION 3.

	Ash-free. I.	II.	Average.
Carbon	52.34	----	52.34
Hydrogen	6.73	----	6.73
Nitrogen	15.90	15.92	15.91
Sulphur, Oxgen	----	----	25.02
			100.00
Ash			0.82

The filtrate from this preparation was next treated with a large quantity of absolute alcohol, and the contained proteid completely thrown down. This substance, preparation 4, dissolved entirely in water; its solution yielded but a trace of coagulum on heating, and when boiled and filtered gave a strong proteose reaction. It contained, ash-free, only 12.02 per cent. of nitrogen, and had a diastatic activity of 11.

These results prove: that extraction of the malt with twenty per cent. alcohol is not suited for a subsequent precipitation of the proteids with ammonium sulphate: that otherwise, the method is capable of yielding preparations of diastase of high fermentative power, which to a certain extent, can be separated into fractions containing the different forms of proteid matter: that the fractions including the greatest amount of soluble albumin have the greatest diastatic power: and that a part at least of the proteose is almost if not entirely free from this power.

Another extraction was made on a much larger scale, so that the fractional precipitations might be more numerous, and the fractions examined more closely.

Ten kilograms of malt were exhausted with water and the extract was saturated with pure and neutral ammonium sulphate. The very bulky precipitate was suspended in four liters of water and dialyzed until much of the sulphate had been removed and the precipitated proteid largely dissolved. The solution was then filtered from an insoluble residue consisting mostly of globulin, and the clear filtrate was saturated with ammonium sulphate. The precipitate thus obtained was suspended in 1500 c. c. of water and was dialyzed until nearly all the sulphate had been removed and the precipitate mostly dissolved. The globulin contained in the extract was thus largely separated and, after it had been filtered out, the clear solution was dialyzed into an equal volume of alcohol of .84 sp. gr. After 48 hours the precipitate, number I, which had separated was filtered out and set aside for further examination. The filtrate was again dialyzed into an equal volume of alcohol of 0.84 sp. gr., and after 48 hours another precipitate II obtained. The filtrate was further dialyzed into a rather larger quantity of somewhat stronger alcohol, and precipitate III separated, and by similarly treating the filtrate from this, precipitate IV was obtained, the filtrate from which, on adding a large quantity of absolute alcohol yielded precipitate V. All the proteid in the extract was thus separated. Precipitate I was much

contaminated with coloring matter, II less so, and III was nearly colorless, as were also IV and V.

The approximate weights of each of these precipitates was as follows: I, 13.0 grams; II, 8.0; III, 6.0; IV, 5.0; and V, 3.0, a total of 35.0 grams.

Precipitate I was treated with water and found to be very largely insoluble. The insoluble matter was filtered out and washed with water, and the clear solution was dialyzed for several days to remove all the salts. No proteid was thus precipitated, and the dialysis was continued in strong alcohol, thereby throwing down all but a trace of proteid. The precipitate, preparation **5**, weighed 2.11 grams. After drying, it dissolved in water with the exception of a small residue, and its solution when slowly heated became turbid at 65° and deposited flocks at 70°. After boiling and filtering out the slight coagulum, the solution gave a strong pink reaction with the biuret test. These tests show the preparation to consist largely of proteose. Its composition was as follows:

PREPARATION 5.

	Ash-free.
Carbon	53.16
Hydrogen	7.03
Nitrogen	16.50
Sulphur	1.50
Oxygen	21.81
	100.00
Ash	0.49

With Lintner's test this preparation showed a diastatic power of 30.

The insoluble residue, remaining after treating precipitate I with water, was thoroughly extracted with ten per cent. sodium chloride solution, what remained insoluble in this menstruum was filtered out and the clear solution dialyzed until free from chlorides. The precipitate thus formed, preparation **6**, weighed 1.20 grams, and after drying was not soluble in water, but dissolved readily and nearly completely in salt solution, having, as was to be expected, the properties of a globulin. This substance had a very slight diastatic power, and its sodium chloride solution when heated slowly became turbid at 60°, a few flocks appearing at 65°, due to a trace of albumin. Its composition was as follows:

PREPARATION 6.

	Ash-free.
Carbon	53.11
Hydrogen	6.45
Nitrogen	15.78
Sulphur } Oxygen }	24.66
	100.00
Ash	0.75

The filtrate from preparation 6 still contained proteid matter which was separated by dialysis in alcohol. Preparation 7 was so obtained, weighing 1.54 grams, having the same properties as 6, and the following similar composition:

PREPARATION 7.

	Ash-free.
Carbon	53.58
Hydrogen	6.70
Nitrogen	15.87
Sulphur } Oxygen }	23.85
	100.00
Ash	1.43

After extracting precipitate I with water and salt solution a very considerable part still remained undissolved. This was treated with water to remove all the salt, and then with alcohol, and was dried over sulphuric acid. This preparation, 8, weighed 8 grams and was quite dark in color. It had the properties of an insoluble form of globulin, being dissolved in one-half per cent. sodium carbonate solution and precipitated therefrom by neutralization. Its composition was nearly the same as that of the two last globulin-like preparations and is probably a so-called "albuminate" derived from that substance. The composition of preparation 8 was:

PREPARATION 8.

	Ash-free.
Carbon	53.55
Hydrogen	7.01
Nitrogen	15.72
Sulphur	1.23
Oxygen	22.49
	100.00
Ash	1.09

Precipitate II was treated with water and the solution thus formed was dialyzed in water for several days and then in alcohol

for 24 hours. A quantity of absolute alcohol was finally added to the contents of the dialyzer, thus completely precipitating the proteid. This preparation after drying was almost wholly soluble in water, and when heated slowly its solution became turbid at 60° and deposited flocks at 66°. The amount of proteid thus coagulated was somewhat greater than was given by preparation **5**, and its diastatic power was likewise greater, being 75. Analysis showed its composition to be as follows:

PREPARATION **9**.

	Ash-free.
Carbon	53.19
Hydrogen	6.71
Nitrogen	16.74
Sulphur	1.38
Oxygen	21.98
	100.00
Ash	0.78

This preparation contained a slight amount of insoluble matter, some albumin and much proteose.

The residue of precipitate II, which was not dissolved by water, was treated with sodium chloride solution and the clear extract dialyzed till free from chlorides, but as no precipitate was produced, the dialyzer was transferred to alcohol when preparation **10** separated, weighing 0.49 gram, and containing, ash-free, 15.18 per cent. of nitrogen. It is probable that this is the same globulin obtained in larger quantity from precipitate I, but less pure. That part of precipitate II which remained undissolved after extracting with water and salt solution, was then washed thoroughly with water and with alcohol, yielding preparation **11**, which weighed 5.0 grams and had the following composition:

PREPARATION **11**.

	Ash-free.
Carbon	53.51
Hydrogen	6.75
Nitrogen	15.76
Sulphur	1.12
Oxygen	22.86
	100.00
Ash	0.66

These figures show that precipitate II contained less globulin and proportionately more leucosin and proteose than precipitate I and it was accordingly found to be more powerfully diastatic.

Precipitate III was in turn treated with water, the resulting extract filtered clear, dialyzed for several days in water and then in alcohol, absolute alcohol being finally added in quantity to the contents of the dialyzer. The resulting precipitate, preparation **12**, weighed 3.0 grams. It was almost completely soluble in water, and its solution when slowly heated became turbid at 55° and flocculent at 60°. The amount of this coagulum was much greater than that yielded by preparation **9**. The filtrate from the coagulum gave a strong proteose reaction. The diastatic power was 222, indicating the presence of much more diastase than any of the preceding preparations. Its composition was as follows:

PREPARATION **12**.

	Ash-free.
Carbon	52.80
Hydrogen	6.96
Nitrogen	16.09
Sulphur	1.45
Oxygen	22.70
	100.00
Ash	0.59

The residue of precipitate III was digested with salt solution, the filtered extract was dialyzed in water till free from chlorides, and then, as no proteids separated, the dialysis was continued in alcohol. Only 0.28 grams of proteid resulted, which, without correction for ash, contained 12.53 per cent. of nitrogen. This was marked preparation **13**, and considered to be impure globulin.

The part of precipitate III still undissolved was washed with water and with alcohol, yielding preparation **14**, which weighed 2.87 grams. This had the following composition:

PREPARATION **14**.

	Ash-free.
Carbon	53.25
Hydrogen	7.65
Nitrogen	16.12
Sulphur	1.38
Oxygen	21.60
	100.00
Ash	0.55

This preparation has a somewhat higher nitrogen and lower carbon content than preparations **8** and **11**, which is probably due to its being a mixture of the insoluble form of the globulin with

some insoluble albumin coagulated by the long contact with alcohol to which it had been subjected. This is to be expected, as precipitate III contained relatively more albumin than precipitates I and II.

Precipitate IV was next treated with water, the solution filtered clear, dialyzed for some days in water, and afterwards transferred to alcohol and the dialysis continued. Absolute alcohol was then added to the contents of the dialyzer, giving preparation **15,** weighing 4 grams. This substance dissolved in water to a nearly clear solution, which when filtered perfectly clear and heated carefully became turbid at 50° and gave a large coagulum at 56°. After heating the solution and filtering off the coagulum, a good reaction for proteose was obtained with the biuret test. This preparation had a diastatic power of 600. As this was a much more powerful ferment than any yet produced, its properties were carefully studied and will be described at length later. When analyzed this substance was found to have the following composition:

PREPARATION **15.**

	Ash-free.
Carbon	52.50
Hydrogen	6.72
Nitrogen	16.10
Sulphur	1.90
Oxygen	22.78
	100.00
Ash	0.66

It will be noticed that the sulphur in this preparation is a little higher than in the preceding preparations, which is probably due to its containing some sulphate.

The part of precipitate IV which did not dissolve in water was treated with salt solution, but no globulin was extracted. The residue was then washed with water, giving preparation **16,** which weighed 0.9 gram and had the following composition:

PREPARATION **16.**

	Ash-free.
Carbon	53.42
Hydrogen	7.15
Nitrogen	16.65
Sulphur, Oxygen	22.78
	100.00
Ash	0.24

The composition of this insoluble product shows it to be probably coagulated leucosin.

A portion of precipitate V, when treated with water, was found to dissolve completely. It was therefore washed with absolute alcohol, yielding preparation **17**, which weighed 2.87 grams. The clear solution of this substance when heated became turbid at 50°, and yielded a small coagulum at 58°. Boiled and filtered a strong pink coloration was given with the biuret test, thus showing it to consist mostly of proteose. The diastatic power of this substance was 60, only one-tenth that of preparation **15**. Its composition was:

PREPARATION **17**.

	Ash-free.
Carbon	51.21
Hydrogen	6.52
Nitrogen	15.40
Sulphur } Oxygen }	26.87
	100.00
Ash	2.37

The lower nitrogen content of this preparation indicates that the strong alcohol had thrown down, together with the proteids, some non-nitrogenous substances.

Much is to be learned by studying these results which will be of service in future attempts to isolate pure diastase.

In the first place, it is plain that we have in our malt extract a globulin, an albumin and at least one, more probably, two, forms of proteose. I believe the substance soluble in salt solution to be a true globulin, since it so readily assumes an insoluble form, and also because a much larger quantity of the same body was obtained by extracting with ten per cent. salt solution, the malt-residue remaining after the extraction with water. I also think that at least two forms of proteose are present, for the water-soluble portion of precipitate I consisted chiefly of proteose, as did also precipitate V. The amount of proteose diminished from precipitate I to precipitate IV, which contained the least, while precipitate V, which, it will be remembered, was thrown down by adding to the solution a very large amount of absolute alcohol was mainly proteose. A part of the proteose was precipitated by alcohol more readily than the albumin, while another part was less readily precipitated. Beside the albumin, globulin and

proteoses, we have also to take account of the "albuminate" or insoluble forms of the albumin and globulin. The results of this extraction show that the globulin is rendered insoluble more rapidly than the albumin, so that precipitation with alcohol and solution in water, repeated a few times, may be depended upon to remove the former. Whether repeated fractional precipitation can be employed to completely separate the albumin from the proteoses is not so certain. The albumin is thrown down from the malt-extract by saturation with magnesium sulphate, and it is not unlikely that a complete separation can be accomplished by this reagent. It is, however, not to be forgotten that the diastase may be a substance which when heated to from 50°–60° splits apart into an albumin and a proteose, and that the proteose found in the solutions which have been heated is a decomposition product of the diastase. Kühne's attempts to produce pure trypsin led him to suspect that this ferment is a body which when heated yields a coagulable fraction and a proteose-like substance.

Now that we have some precise knowledge of the associated substances, it seems probable that we may succeed in obtaining diastase nearly if not quite pure, and arrive at a clearer and more positive knowledge of this ferment, and also have a guide in further study of other enzymes, which will lead to a more satisfactory understanding of this whole subject. It is probable that the ferments contained in seeds are much easier to prepare than those of animal origin, since the substances with which they are associated are largely non-proteid and comparatively easy to separate. It is also certain that the amylolytic ferments present an easier problem than the proteolytic, for the products of the activity of the latter are so similar, in their nature, to that which the ferment is supposed to possess, as to make it always a matter of great uncertainty whether the separated enzyme is free from those bodies or not.

As already stated, preparation **15** was a very energetic ferment, and on this account its properties were more fully studied, with the following results:

Dissolved in water this substance gave all the usual proteid reactions, and when heated slowly became turbid at 50° and gave a flocculent coagulum at 56°. This is exactly the temperature of coagulation of the albumin (leucosin) which I have prepared from wheat, rye, barley and malt, with identical composition and properties. The aqueous extracts of these grains have,

moreover, a strong diastatic action on starch. The amount of coagulable albumin in preparation **15** was determined and found to be 53.2 per cent. of the dry substance.

These facts point strongly to the albumin as being the diastatic substance, yet there are several facts, hard to explain if this is true, which cannot be overlooked. Although in general the diastatic power of my preparations was greater the larger the amount of coagulable albumin they contained, I have never yet been able to establish any numerical relations between the two. In no case have I found any diastatic action with solutions free from albumin. Furthermore, the activity of my preparation **15**, is such as to require a much greater diastatic power for malt than this shows if its coagulable albumin is the enzyme.

A malt extract corresponding to a solution of the diastase in five milligrams of malt had the same diastatic power as 0.02 milligram of preparation **15**. As the preparation contained but a little over 50 per cent. of coagulable albumin, this would correspond to only 0.01 milligram of albumin in the five milligrams of malt, or two-tenths per cent. The amount of albumin in malt is much greater than this, as it is also in wheat, rye and barley, whose diastatic power is greatly inferior to that of malt. It is not probable that the *separated* diastase is more active than that *in the seed*, especially in view of the experiments which follow, comparing the action of malt extract and preparation **15**. The only explanation of this that occurs to me, is that the active diastase is a combination of albumin with some other body, presumably the proteose, which breaks up on heating, yielding coagulated albumin, and that, besides this combined albumin, free albumin is also present, which has no diastatic power, but which is coagulated at the same time. There is no direct evidence, however, that this hypothesis is correct.

Compared with other so-called pure ferments, preparation **15** is very active. At 20° it was in a condition to produce, from soluble starch, over 2000 times its weight of maltose and a further undetermined quantity of dextrin, within one hour. After having been dried over sulphuric acid and kept for six months, its activity was reduced to one-half, but in this condition it produced in 17 hours, at 20°, 10,000 times its weight of maltose besides an unknown quantity of dextrin. At 45° the same quantity of maltose was produced in one hour as at 20°. At 50° much less and at 55° very little maltose was formed. These tests were made by using

an amount of diastase solution just sufficient to produce enough maltose at 20° to exactly reduce 5 c. c. of Fehling's solution.

Compared with malt extract of the same diastatic strength, as measured by the amount of maltose produced in one hour at 20°, the distilled water solutions of preparation **15** have a less powerful action in liquifying starch paste. Five c. c. of malt extract added to ten c. c. of a starch paste containing 2 per cent. of starch, dissolved the starch completely in eight minutes, while the solution of preparation **15** required thirty-seven minutes.

The malt extract is also more energetic in converting starch completely into bodies giving no color with iodine. Five c. c. of the same malt extract added to ten c. c. of soluble starch solution caused the blue reaction with iodine to disappear in thirteen minutes, while it required thirty-eight minutes to reach the same result with the solution of the separated diastase. When, however, the diastase was dissolved in malt extract, whose enzymes had been previously killed by heating, the difference between the separated diastase and that in the malt extract nearly disappeared.

Two test tubes were each charged with 10 c. c. of starch paste. To one tube was added 5 c. c. of fresh malt extract, and to the other the same amount of boiled and cooled malt extract in which had been dissolved a quantity of preparation **15**, sufficient to make a solution of the same sugar-producing power as the fresh malt extract itself.

The fresh malt extract liquefied the starch in seven minutes, the mixture of preparation **15** and boiled malt extract in fourteen minutes, while thirty-seven minutes were required to produce the same result with a distilled water solution of preparation **15**. In completely converting starch into bodies giving no color with iodine, the solution of preparation **15** in boiled malt extract gave exactly the same result as the fresh malt extract, showing that the difference first noticed was due to the conditions and not to the ferment.

In view of these results, it seems highly probable that diastase is a true proteid, for if we consider the extremely minute quantity of preparation **15** required to produce large amounts of maltose, it is hard to believe that this action is due to some substance adhering to the proteid to the extent of only three or four per cent. at the most. If such were the case it is also remarkable that the enzyme should adhere in so much greater quantity to

the particular precipitate represented by preparation **15** than to any of the other numerous fractions. If diastase, then, is to be considered as a true proteid, it is evidently either an albumin, a combination of an albumin with a proteose, or a proteose. We have seen that those fractional precipitates which consist largely or wholly of proteose have little or no diastatic action, amylolytic power being manifested most strongly in the fractions containing the most albumin, and least in those containing but little, though not in strict proportion to the amount of the albumin. It is to be concluded that the diastatic enzyme is most closely related to the albumin, named leucosin, and it is not improbable that further careful study will show more clearly what this relation is.

WORK DONE FOR THE DAIRY COMMISSIONER.

By E. H. Jenkins.

The General Statutes of Connecticut provide that the Dairy Commissioner of this State "may have samples suspected to be imitation butter analyzed at the Connecticut Agricultural Experiment Station, or by any State chemist, and a sworn or affirmed certificate of the analyst shall be *prima facie* evidence of the ingredients," etc.

The statute does not require the Station to make these analyses, neither does it provide for any payment to the Station for the work.

The Station has, however, thus far done all the work required by the Dairy Commissioners gratuitously, as there appeared to be no other way in which the Commissioners could have it satisfactorily performed.

The provision that a chemist's affidavit shall be *prima facie* evidence has been ruled by the courts to be unconstitutional.

The affidavit being really the foundation of the accusation the one who draws it must appear in court. Hence the work done for the Commissioner involves the necessity of appearing at every police court where the cases are first brought and when appealed, at the Superior Court till they are finally disposed of.

This feature of the work is the most expensive, taking much time which cannot well be spared from Station duties. No expert fee can be allowed for it by the courts. The Station therefore receives the usual witness fees; mileage and fifty cents for each appearance!

During the year ending Nov. 1st, 1894, twenty-three samples of butter and five of molasses have been examined and sworn statements returned to the Commissioner. In twelve cases expert evidence has been offered in court.

In no case since the office of Dairy Commissioner was created, has the evidence given by the Station been disputed.

THE BABCOCK METHOD OF FINDING THE AMOUNT OF BUTTER-FAT IN MILK AND CREAM.

By A. L. Winton and A. W. Ogden.

This method is based on the fact that when milk, cream, skim-milk, and butter-milk are mixed in proper proportions with sulphuric acid of a certain strength the acid dissolves or mixes with all the milk-ingredients except the butter-fat, and the latter is completely separated with suitable apparatus and accurately measured.

The quantity of butter-fat determined by the Babcock method, is the most satisfactory basis of payment for milk or cream. It is used by numerous successful creameries east and west and promises to become almost universally applied.

In Bulletin 106 of this Station. issued in 1891, the attention of Connecticut dairymen was called to this method. To answer inquiries more frequently made of late regarding the way to work the Babcock test, Bulletin 117 was issued in January, 1894. In its preparation full use was made of Bulletin 36, of the Wisconsin Experiment Station, written by Dr. Babcock. The substance of Bulletin 117 is here reproduced with suitable additions.

Directions are first given for weighing and sampling milk and its products. Then follow instructions for preserving samples which cannot be immediately tested, and lastly the method of executing the tests is fully described.

Directions for Weighing.

Milk.—To determine the quantity of butter-fat which a cow produces it is absolutely necessary in the first place to know the quantity of milk which she gives.

Weigh the milk accurately at milking time, which may be conveniently done on a spring balance in a pail which weighs an even number of pounds.* If the milk cannot be weighed, the number of quarts multiplied by 2.15 will give its approximate weight. Thus: $8\frac{1}{2}$ quarts is about ($8\frac{1}{2} \times 2.15 =$) 18.3 pounds. *The measuring must be accurate.* Froth is not milk. A quart measure filled to a quarter of an inch of the top is not a quart.

* See page 217.

An "eight quart" pail may hold considerably less or more than eight quarts.

Skim-milk and Butter-milk.—To learn how complete the skimming has been, or how much butter-fat is lost in butter-milk, it is absolutely necessary to know the weight as well as the per cent. of butter-fat in each. The whole quantity must therefore be thoroughly mixed and weighed.

Cream.—A description of the method used for weighing cream will be found on pages 217 and 220.

Directions for Sampling.

Milk of Single Cows.—Milk that has soured or on which cream has risen and dried, so as to form a clot or skin, cannot be accurately sampled on the farm.

Thoroughly mix the milk, as soon after milking as possible, either by pouring three or four times from one pail to another, or by stirring vigorously with a dipper. To secure an accurate sample, thorough mixing is absolutely essential. Failure to secure a fair sample makes the test worthless or worse than worthless. Immediately after mixing, dip out a sample of about one-half gill or two ounces. From this a sample may be at once measured in the way to be described later for testing, or the whole quantity may be put into a *clean and dry* bottle,* with a preservative when necessary, and kept till used in a cold place where it will not freeze.

Mixed Milk of a Herd..—Into some vessel like a cream carrier, pour all the milk from the pails or cans *one immediately after the other*, and from such a height that the whole quantity is stirred up from the bottom. Then with a cup, dipper or pitcher, *at once* take out about a pint. Stir this thoroughly with a spoon immediately before pouring into the sample bottle, or before measuring the quantity for the Babcock test. If there is no can at hand large enough to hold the whole lot of milk, very accurate sampling is more difficult. Still if the milk is in a number of cans or pails of the same size or shape, and all have the same quantity of milk in them, a fair sample may be got by taking the same quantity of milk, a gill, pint or quart, from each can or pail, after thorough stirring as already described, mixing these samples thoroughly, and then taking a single sample from the mixture.

* Rather than try to use large bottles or those not perfectly clean it is better to buy from a druggist new two-ounce bottles with new corks.

Skim-Milk and Butter-Milk.—The same course should be followed as with the mixed milk of a herd. The *whole quantity* of the skim-milk or butter-milk should be mixed. The sample must not be taken from a part of it.

Cream.—Cream that is very thick, clotted or soured cannot readily be sampled on the farm. The same is true of centrifugal cream when it is badly frothed; but sweet cream thin enough to pour freely, may be sampled in the same way as whole milk, after pouring it two or three times from one vessel to another. See page 211.

Directions for Preserving Samples.

Composite Samples.—If the samples daily taken from the milk of a cow or herd or from the cream supplied by a creamery patron are poured as soon as drawn into a bottle kept for the purpose and mixed together, this mixture is a "composite sample" and represents the average quality of the milk or cream for the entire period during which daily samples were added to it.

By a test of this composite therefore it is possible to determine the average per cent. of butter-fat in the milk or cream for the whole of this period, which may be one, two or even three weeks.

The daily samples of milk added to the composite must be fairly proportional to the total quantity of milk. Full directions regarding the preparation and preservation of such samples will be found on page 222.

Apparatus for Making the Test.

Test Bottles.—The test bottles used for whole milk (figure 1) have graduations from 0 to 10, each division of the scale representing 0.2 per cent. These bottles can be used also for skim-milk and butter-milk, but a bottle which holds twice as much and has a scale graduated to 0.1 per cent. (shown in figure 2) is preferable for that purpose.

The bottle used for cream testing is described on page 223.

Pipettes.—For whole milk, skim-milk and butter-milk a pipette delivering 17.6 cubic centimeters is used (figure 3). When skim-milk and butter-milk are tested in bottles shown in fig. 2, the pipette is filled twice, that is to say 35.2 c. c. are used for the test. The pipette to be used in testing cream is described on page 223.

Acid Measure.—This is a glass graduate which holds, when filled to the mark, 17.5 c. c. See fig. 4.

Centrifugal Machine.—Most makers of dairy machinery supply machines suitable for the purpose. The sizes vary from four bottle testers to those carrying fifty or more bottles, those last

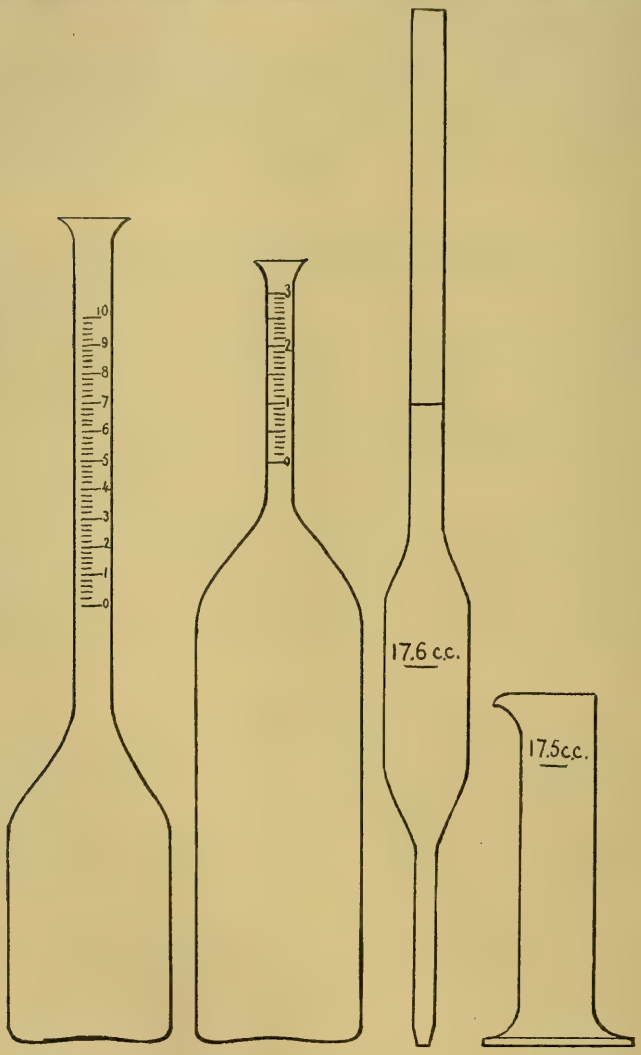


FIG. 1. FIG. 2. FIG. 3. FIG. 4.

being designed for factory use. The wheel to whose circumference the bottles are attached should make from 700 to 1200 revolutions per minute according to its diameter, about 700 revolutions being sufficient for the larger wheels with a diameter of

about 20 inches, while small 12-inch wheels should run at the rate of about 1200 revolutions per minute.

Commercial Sulphuric Acid (*Oil of Vitriol*).—This should have a specific gravity of 1.82. For further description see page 225.

Directions for Making the Test.

The details of the process of testing are the same for whole milk, skim-milk, butter-milk and cream (except as far as the quantities for testing, and the form of the bottles is concerned, and are fully described on pages 226 to 229.

The method of measuring the fat of milk, skim-milk and butter-milk is as follows :

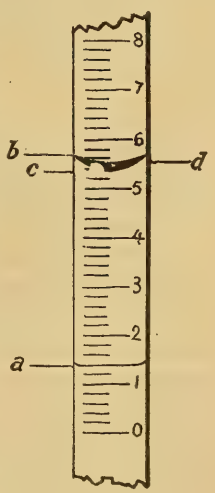
Measuring the fat.—The fat when measured should be warm enough to flow readily, so that the line between the acid liquid and the column of fat will quickly assume a horizontal position when the bottle is removed from the machine.

Any temperature between 110° F. and 150° F. will answer, but the higher temperature is to be preferred. The slight difference in the volume of fat due to this difference in temperature is not sufficient to materially affect results.

To measure the fat, take a bottle from its socket, and holding it in a perpendicular position with the scale on a level with the eye, observe the divisions which mark the highest and the lowest limits of the fat. The difference between these gives the per cent. of fat directly. The reading can easily be taken to half divisions or to one-tenth per cent.

The line of division between the fat and the liquid beneath is nearly a straight line and no doubt need arise concerning the reading at this point, but the upper surface of the fat being concave, errors often occur by reading from the wrong place. The reading should be taken at the line where the upper surface of the fat meets the side of the tube and not from surface of fat in the center of the tube nor from the bottom of the dark line caused by the refraction of the curved surface. For instance in Fig. 6 the reading should be taken from *a* to *b* and not to *c* or *d*.

Fig. 6.



The reading may be made with less liability of error by measuring the length of the column of fat with a pair of dividers, one point of which is placed at the bottom and the other at the upper limit of the fat. The dividers are then removed and one point being placed at the 0 mark of the scale on the bottle used, the other will be at the per cent. of fat in the milk examined.

Sometimes bubbles of air collect at the upper surface of the column of fat and prevent a close reading; in such cases a few drops of strong alcohol (over 90 per cent.) put into the tube on top of the column of fat, will cause the bubbles to disappear and give a sharp

line between the fat and alcohol for the reading. Whenever alcohol is used for this purpose, the reading should be taken directly after the alcohol is added, as after it has stood for a time, the alcohol partially unites with the fat and increases its volume.

Whenever the fat is not quite clear, more satisfactory results may be obtained by allowing the bottles to stand until the fat has crystallized and then warm them by placing the bottles in hot water, before taking the reading.

If the column of fat is less than about one division as will often happen with skim-milk, butter-milk or whey, it may assume a globular form instead of a uniform layer across the tube; when this occurs the fat can usually be estimated with sufficient accuracy by simple inspection, but in such cases it is better to take a double portion of milk in a large bottle.

The way of reading is illustrated in the figure. The bottom of the clear yellow liquid fat layer is at *a*. The upper surface is represented by *b*, *c*, *d*. The readings are 1.4 and 5.7. The difference, 4.3, is the per cent. of fat in this sample of milk.

To the breeder of dairy stock, to the dairyman who wishes to knows what his cows return for their keep, and to creameries, whether milk gathering or cream gathering, the Babcock tester can be of the greatest service.

THE BABCOCK TEST AS A BASIS FOR PAYMENT IN CREAM-GATHERING CREAMERIES.

By A. L. Winton and A. W. Ogden.

In Bulletin 108, issued by this Station in May, 1891, it was stated that the Babcock test "offers to cream-gathering creameries, a practicable and accurate method of ascertaining the actual quantity of butter-fat which each patron furnishes, so that payments may be based, not on volume of cream supplied, but on *actual butter-fat*, which is the raw material that the creamery manufactures. This is obviously the most satisfactory method of payment."

Since that time, this method has been adopted by several creameries in other States, but nothing of the kind was attempted in Connecticut, until the winter of 1893–4.

Several creamery managers having expressed a desire to introduce a system of payment based on the Babcock test, a practical study of such a system was made early in the year with the

coöperation of the managers of the Golden Ridge Creamery at Berlin, Conn. The first trials were partly to study the inequalities of the space system and partly to determine by practical experience the forms of apparatus best suited for the Babcock system.

A few weeks experience demonstrated the unfairness of the space system and the practicability of the system based on the Babcock test. At a meeting of the directors of the creamery it was voted to abandon the space system and pay for cream according to the fat which it contained as shown by the Babcock test. On March 1st this change went into effect.

In response to special request, eight other cream-gathering creameries were subsequently visited and the working of the new system illustrated. The plan followed at most of these creameries was to run the two systems side by side for a day thus securing a comparison of results and at the same time giving those interested opportunity to become acquainted with the details of the Babcock system.

The results of these comparative tests are given on pages 236 to 244.

Of these eight creameries, five decided later to adopt the Babcock system and were further assisted by us in carrying out this decision. All of the six creameries which have, with our coöperation, introduced the new system are to-day running successfully on that plan, and others have adopted or are about to adopt the method.

Defects of the Space System of Payment for Cream.

Most of the cream gathered by creameries in this State, is raised by the submerged, deep-setting system, and is paid for by the "space." The "space" is the volume of a cylinder $8\frac{1}{2}$ inches in diameter and $\frac{19}{64}$ of an inch high, and the number of "spaces" in each can of milk is read off before skimming, by means of a strip of glass set in the sides of the can on which the space graduations are marked. The unit for payment is therefore a given volume of cream which, to make the system perfectly equitable, should always contain the same quantity of pure butter-fat.*

* Butter is a mixture of butter-fat—its essential, most abundant and most distinctive ingredient—with more or less water, salt and curd. As the quantities of these several ingredients in butter are quite variable, accuracy and simplicity are best secured by basing all calculations on the quantities of *butter-fat.*

That the "space" does not always contain the same quantity of butter-fat and that the differences in the quantity of butter-fat in it are often large enough to make this system of payment unfair, are facts of every day observation in creamery practice, which have also been abundantly confirmed by chemical tests. See pages 236 to 244.

Even when the directions of the makers of the apparatus and of the creamery manager are closely followed, the cream raised from milk of one and the same herd, which is fed, handled, and milked as uniformly as possible, will yet show moderate differences in the quantity of butter-fat present, per "space," from day to day.

The time which elapses from the setting to the skimming of the milk, has considerable effect on the number of spaces gathered. For a certain time after setting, the depth of the cream layer and the number of spaces, increase; then follows a period during which the number of spaces slowly decreases, on account of the coalescence of the fat particles, but the per cent. of butter-fat and with it the value of the cream for butter making, is, nevertheless, all the while increasing.

But when the prescribed method of setting is not closely followed by a part of the patrons, differences in the quality of the "space" become so large as to work great injustice to other patrons and generally to those who are producing the most and the best cream. Abundant proof of this will be noticed in the following pages.

Much dissatisfaction comes from the fact that during the winter it is absolutely necessary in some creameries for each patron to measure and record the "spaces" of cream which he raises, so that he may have his cans for use again. The cream-gatherer only makes from two to four trips a week, to get the cream and a copy of the patron's score.

In addition to the defects already noted, it need hardly be said that the dishonest patron may so manipulate his cream as to increase the number of spaces in ways which the cream-gatherer is unlikely to detect.

While the system of setting milk and raising cream now generally in use, if strictly followed, is an excellent one, well suited to our conditions, the system for payment is unsatisfactory because it does not bear a close relation to the actual butter-fat furnished by the several patrons to the creamery.

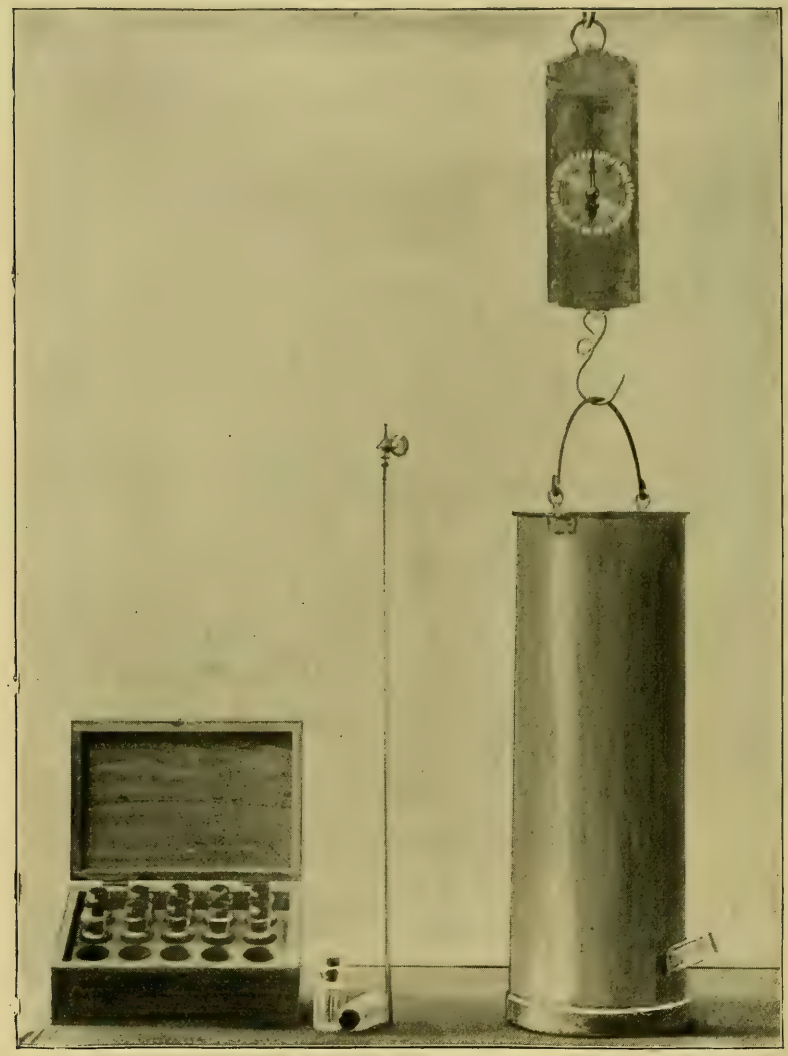


PLATE XIV. Outfit of the Cream Gatherer.

The Method of Payment According to Amount of Butter-Fat Furnished.

On the following pages is a full description of the system which, with the advice of this Station, has been adopted by a number of Connecticut creameries and which, it is believed, secures to all the patrons fair payment for the cream furnished.

The plan followed is briefly this: The cream, skimmed by each patron, is weighed by the cream-gatherer who also takes a sample accurately representing the entire cream, both as to its quantity and its quality. The samples of each patron's cream gathered from day to day, are mixed and make a "composite sample" which is kept from curdling by a preservative and is finally tested by the Babcock method.

From the total weight of cream gathered and the per cent. of fat in it, the actual weight of butter-fat furnished by each patron is determined and is placed to his credit. Spaces are not taken into account.

APPARATUS FOR SAMPLING AND WEIGHING THE CREAM.

See Plate XIV.

Spring Balance.—A No. 270 Chatillon spring balance, weighing 60 pounds by 2 ounces, is commonly used for weighing the cream. In order to avoid calculation, the index may be set back one-quarter of the circle (equivalent to 5 pounds), so that when the empty pail, which is made to weigh 5 pounds, hangs on the balance, the index stands at 0. See plate XIV.

Prof. Woods of the Storrs Station has devised an improved form of this balance with a loose index, which by means of a set screw, can be adjusted to tare a pail of any weight. A jam screw prevents loosening of the index. Such balances are now made by the Chatillon Spring Balance Co., 85 to 93 Cliff Street, N. Y., and are designated by them as No. 270 M. They can be obtained from all dealers in dairy supplies.

These scales properly used will last for a number of years and may then generally be repaired at a cost of $1.00 to $1.25. They should not be exposed to rain unnecessarily, as the rusting of the mechanism destroys their accuracy.

The pail should not be thrown on the scale hook with a sudden jerk. To draw out the slide and let it snap back suddenly is the worst possible treatment the scale can receive.

The balance may hang on a proper support from the back of

the gatherer's wagon, at such height that the pail full of cream can be hung on it handily, but will not touch the ground, or the gatherer may take it with him to the room where the patron keeps his cream, and hang it on a hook provided for the purpose. The advantages of the latter plan are, that the weighing, recording and sampling, are done under cover, and a trip from the cart to the patron's score card, which it is necessary to make when the cream is weighed at the cart, is avoided.

Pail for Sampling and Weighing.—This pail should be of cylindrical (not conical) form with a stout bail, and, to aid in pouring, it must either be provided with a handle on the side near the bottom, or have the sides extend an inch or two below the bottom. It may have any diameter from 8 to 12 inches, but the height should be so proportioned to the diameter that it will hold about 40 pounds of cream. When carried in the hand it should clear the ground by several inches. See plate XIV.

Sampling Tube.—This tube, devised by Mr. Ogden, is of stout brass about $\frac{1}{32}$ of an inch thick, and a few inches longer than the weighing pail which is used with it. On the upper end, a small brass stop-cock of the same bore is fastened. It should be nickel plated inside and out to keep the metal smooth and free from corrosion. These tubes may be obtained from less than $\frac{3}{16}$ to over $\frac{1}{4}$ inch bore. The greater the diameter of the weighing pail, the wider should be the bore of the tube. For use with pails 8 inches in diameter, a $\frac{3}{16}$ inch bore sampling tube will serve the purpose but when the pail has a diameter of 9 or more inches a tube with a bore of $\frac{1}{4}$ inch or more should be used. It must be borne in mind that doubling the diameter of the pail, or of the sampling tube, increases the capacity fourfold.

The tube when not in use should be kept in an upright position to permit draining.

Sample Bottles.—Two sets of sample bottles are used:

(1.) *Collecting bottles.*—Small wide-mouthed bottles, holding from one to one and one-half fluid ounces, closed by good corks are suited for carrying the collected samples. Numbers, corresponding to the different patrons, may be burned into the tops of the corks by means of a red hot iron. The bottles themselves are not otherwise marked. These are taken by the cream-gatherer on each trip, to receive the samples that represent every lot of cream collected. See Plate XIV.

The gatherer should be provided with a convenient case, having a compartment for each bottle, and a cover which when closed and fastened, will hold the corks securely in their places.

(2.) *Composite Sample Bottles.*—Half pint "Lightning" fruit jars, or wide-mouthed bottles of convenient size fitted with corks, are used for this purpose. The bottles should not be much larger than is necessary to hold the largest of the composite samples.

INSTRUCTIONS FOR SAMPLING AND WEIGHING THE CREAM.

Numbering of patrons.—The patrons are distinguished by numbers, and the corks of the sample bottles bear corresponding numbers. To avoid error each patron's number should be posted in a conspicuous place near his creamer.

Skimming.—Patrons are required to draw off their own cream and to keep it protected from dirt and odors, *and at a low temperature.* This saves the time of the cream-gatherer, and puts most of the cans more promptly at the disposal of the patron. If separators are used they are so gauged as to run cream of about the same thickness as Cooley cream, i. e. with not more than 25 per cent., preferably from 18 to 20 per cent., of fat. Pan-set cream, or cream that is frozen or sour cannot be accurately sampled, and is rejected for this, if for no other reason.

Mixing the Cream.—Pour each patron's cream at least twice from one vessel to another. The last pouring must bring it into the weighing pail. *It is absolutely essential that the cream should be thoroughly mixed before sampling. This is the most critical part of the whole operation.* If there is enough cream to fill the weighing pail more than once, each pailful must be carefully mixed and sampled.

The following experiment illustrates the importance of thorough mixing.

A Cooley can full of cream was allowed to stand quiet for 24 hours. Three portions were then taken: the first by dipping from the surface, the second by drawing from the bottom and the third by taking a section through the cream from surface to bottom with the sampling tube.

The remaining cream was poured once into a second can and three portions were taken as before.

After pouring the cream once more, a third sample was drawn with the sampling tube.

Determinations of fat in the several portions gave the following results:—

First: The surface portion of the cream before it was disturbed by pouring contained 28 per cent. of fat, the bottom portion only 5 per cent., or less than $\frac{1}{5}$ as much as the surface.

Second: After the first pouring, there was a difference of only one and one-quarter per cent. of fat between the surface and bottom portions of cream.

Third: The sample taken with the tube before pouring the cream did not contain within three per cent. as much fat as the whole quantity of cream was known to contain.

Fourth: After pouring once, the per cent. of fat in the sample drawn with the sampling tube was practically the same as that in the sample drawn after the second pouring.

The reason why the sampling tube did not draw a correct sample from the cream which had stood quiet for 24 hours was that the very thick cream on the surface was pushed aside by the tube instead of filling into it, thus making the sample deficient in fat. It follows that it is necessary to mix the cream even when a sampling tube is used.

The per cents. of fat found in the test just described were as follows:—

Fat in Cream which stood for 24 *hours.*

	Surface.	Bottom.	Sample drawn with sampling tube.
Not mixed.....	28.0	5.0	19.25
Poured once	23.75	22.0	22.50
Poured twice	----	----	22.25

Sampling and Weighing.—Lower the sampling tube *with the cock open*, to the bottom of the weighing pail which holds the mixed cream. When it is filled raise it out of the liquid and allow it to drain for a few seconds. By this means the tube is rinsed with the cream to be sampled and any traces of cream adhering to the tube from previous use are removed. With the cock still open, slowly lower the sampling tube to the bottom of the cream pail. After allowing a moment for the cream to rise in the tube to the same height as in the pail, close the cock and raise the sampler carefully out of the cream. As long as the cock is closed the cream in the tube will not flow out, unless the tube is strongly jarred. Allow the cream adhering to the outside of the tube to drain off for a few seconds, then put the lower end into the collecting bottle which bears the patron's number on its cork and open the cock. The cream will then flow out of the sampler into the bottle, which is afterwards securely corked and put into the cream-gatherer's case. Immediately weigh the cream in the cream pail to the quarter or half pound as may be judged expedient and record the weight.

If the patron has more than one pailful, repeat with each pailful the operation of sampling and weighing, putting all the samples in one and the same bottle. *Weigh all cream collected, in one and the same sampling pail and draw a sample from each separate portion weighed.*

In case a patron has so little cream that a single portion drawn by the tube from day to day will not be sufficient to make a composite sample large enough for testing, two or more cores may be taken, *but at every gathering the same number.* If two cores are taken to-day, then two must be taken to-morrow and every day until the test is made; if three cores, then three every day.

Operating according to these directions the sample not only represents the quality of the whole amount of cream, but is also proportional to its quantity. If a patron furnishes twice as much cream to-day as he did yesterday, the sample drawn from to-day's cream will also be twice as large as yesterday's and if there is a decided difference in the quality of cream on the two days this method of sampling will make due account of it in the composite sample.

When the whole quantity of cream is very small, less than half a pailful, it is best not to take a sample in the way above described, but putting the sampler in the cream, apply the mouth to the stop cock and suck the sampler full, close the cock and transfer this sample to the collecting bottle.

The size of the sample taken in this way does not correspond to the quantity of cream, but the possible error thus introduced is inconsiderable when the quantity of cream is small and nearly alike from day to day.

If, however, it is desired to be more exact, small lots of cream can be sampled in the way first described, in a pail having a diameter of four inches.

A given quantity of cream in this pail will have four times the depth which it has in the larger one and the sampler will therefore draw a sample four times as large.

Where the gatherer's route is long there has been some trouble during the hottest days of summer with the samples souring or churning during transit. The churning may take place without the sample souring. Such samples should be rejected as it is better to lose a single day's sample occasionally than to render the composite sample unfit for testing. If during hot days the gatherer carries his case of samples in a box with a piece of ice, sour-

ing and churning can generally be prevented provided the cream has been properly cared for previously by the patron and the gatherer is not on the road more than half a day. Churning can be avoided by filling the collecting bottles full to the cork thus avoiding the agitation which takes place in partially filled bottles. The samples thus obtained are all of the same size and do not represent the quantity of cream. If experience has proved that the cream of the several patrons does not vary greatly in quantity from day to day it is sufficiently accurate to add samples of the same size from day to day to the composite sample. If, however, there is considerable variation a quantity proportional to the weight of cream furnished may be measured out each day in a graduate from each man's sample and added to the corresponding composite sample.

As samples of each patron's cream come in to the creamery the superintendent has opportunity to gain an idea of the quality of the product furnished by each. If a sample is sour or foul smelling when it reaches the creamery it is usually evidence that the patron has been remiss in caring for his cream. We have been told by a creamery manager that the feeding of turnips may also be detected by the odor of the daily samples.

THE COMPOSITE SAMPLE.

Preservative.—Bichromate of potash when added in the proportion of one grain of the salt to two ounces of cream (or milk) will preserve the sample, when kept in a cool place, in a suitable condition for testing for at least two weeks.

Although poisonous, this substance is by no means so violent a poison as corrosive sublimate, which some have recommended, and may be used with comparatively little danger. It gives to the liquid an orange yellow color easily distinguishable from pure cream (or milk) which lessens the danger from its use. Packages containing this material should, however, always be labelled "Poison." The quantity used need not be weighed as the amount may vary considerably without affecting the results, although greatly excessive quantities are to be avoided.

A pistol cartridge shell, of .22-inch calibre, cut to a length of $\frac{1}{4}$ inch, will hold, when loosely filled, enough of finely powdered bichromate to preserve one-quarter of a pint of cream.* Con-

* A .22-inch calibre shell cut to $\frac{1}{2}$ inch long holds enough to preserve $\frac{1}{2}$ pint. A .32-inch calibre shell cut to $\frac{1}{4}$ inch long holds enough to preserve $\frac{1}{2}$ pint. A .32-inch calibre shell cut to $\frac{1}{2}$ inch long holds enough to preserve one pint.

venient measures can be made by cutting off shells to the proper length with a file and soldering on a piece of wire for a handle.

When beginning a series of tests, place in each composite sample bottle the quantity of powdered bichromate of potash required for keeping one-quarter of a pint of cream. If the quantity at any time amounts to more than this, more bichromate may be added.

Transferring the Samples.—As soon as the collected samples arrive at the creamery, shake each moderately, pour it into the composite sample bottle bearing the corresponding number and allow the collecting bottle to drain for a moment. Cork the composite sample bottle and give it a rotary motion to mix the new cream with that previously collected, as well as with the bichromate. If this is not done, the thick layer which has risen since the last addition of cream, may adhere to the side of the bottle and finally interfere with taking the portion for testing. Keep the samples in a cool place, but do not allow them to freeze. The small collecting bottles and corks should be put into hot water at once, or before the adhering cream dries to them, should be washed, dried and placed in the cases ready for the next collecting trip. Since only the corks are marked, no confusion of bottles can arise.

APPARATUS FOR TESTING CREAM BY THE BABCOCK METHOD.

Test Bottles.—The form of cream bottle devised by Mr. Winton, and described in Bulletin 117 of this Station, is suited for creamery use. (See figure 1, page 224.) It has a wider neck than the bottles used for testing milk. The neck is graduated from 0 to 30 per cent., but the readings can be readily made to a quarter of a per cent.

One of the most convenient ways of numbering the test bottles is to have a ground or etched spot on the neck of the bottle above the graduation, on which the number of the test can be marked with a lead pencil.

The necessary grinding may be done with a sharp wet file.

Pipettes.—The cream is measured in a pipette delivering 18 cubic centimeters. The opening at the lower end should be rather larger than for milk pipettes, so that the cream, which is thicker than milk, will deliver readily. See fig. 2.

Acid Measure.—This is a glass graduate, which holds when filled to the mark, 17.5 cubic centimeters. The labor of measuring

the acid may be considerably diminished by using the special forms of apparatus devised by Farrington, Patrick and Greiner. See fig 3.

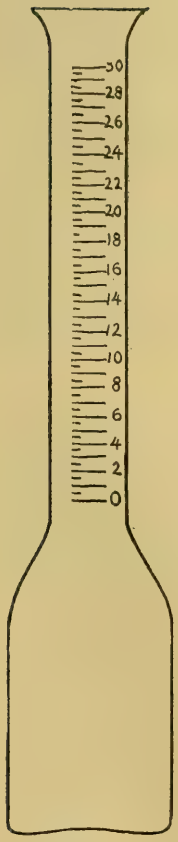


FIG. 1.

FIG. 2.

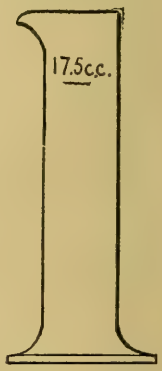


FIG. 3.

Centrifugal Machine.—The so-called steam turbine testers are especially adapted for creamery use. The power is communicated by a jet of steam, playing into pockets attached to the rim

of the wheel which carries the bottles. By this device the time and labor consumed in operating the hand machines are spared and the more complicated machinery of the power testers is avoided. The escaping steam keeps the contents of the bottles from cooling, and after the last whirling, the fat is at a proper temperature for measuring. The wheel to which the bottles are attached should make, during the test, from 700 to 1200 revolutions per minute, according to its diameter; 700 revolutions being sufficient for the larger wheels with a diameter of about 20 inches, while 12-inch wheels should run at the rate of 1200 revolutions per minute. The machine should have a spindle to which a speed indicator can be applied, and should be tested from time to time to make sure that it is working properly. We have found, in creameries, machines which were running too slowly to do thorough work. In ordering machines it should be specified that they shall be fitted with a spindle for testing speed and that when the machine is loaded with the test bottles the shaft shall make the proper number of revolutions per minute with 30 pounds of steam. Be sure that the steam pipe is large enough to deliver *dry* steam and that while the tester is running, the steam is not used elsewhere in such quantity as to interfere.

Commercial Sulphuric Acid (*Oil of Vitriol*).—This should have a specific gravity of 1.82 to 1.83. If much stronger, the fat will be of a dark color; if weaker, the fat is liable to be contaminated with undissolved curd. It should be purchased of guaranteed strength. The acid should be kept in tightly stoppered bottles, as otherwise it rapidly absorbs moisture from the air and becomes too weak. The stopper should be of either glass or rubber and not of cork, which is rapidly destroyed by the acid. This oil of vitriol is extremely corrosive. It will ruin very quickly, clothing or leather on which it falls and soon makes painful burns if in contact with the skin. If the hands come in contact with it they should be immediately and thoroughly rinsed. Sal-soda or wood ashes will neutralize it and check its corrosive action. The greatest care must be used in handling this acid.

Apparatus for Filling the Test Bottles With Hot Water.—A convenient arrangement for this purpose consists of a four quart pail, the contents of which may be delivered through a piece of small flexible rubber tubing attached to a piece of metal tubing that is soldered on the side of the pail at the bottom. The rubber tubing is about three feet long and provided with a pinch-cock.

For use the pail is filled with boiling hot water and placed on a support a foot or two above the machine, thus giving the necessary head. By opening and closing the pinch-cock, the hot water may be delivered in the bottles, in proper quantity.

Making the Test.

Tests may be made twice, three times, or four times a month, as is most convenient, since experience has proved that bichromate will keep cream at least two weeks.

The details of the process of testing are best described, substantially, in Dr. Babcock's own words. Certain minor changes are advisable, as the directions here are wholly designed for testing cream.

Temperature of the Cream.—The composite sample bottles should be brought from the cold room into the room where the tests are to be made and allowed to warm to at least 60° F. before testing. The effect of too cold cream is similar to that of too weak acid.

Mixing the Sample.—Shake the bottle until the cream is thoroughly mixed, and of uniform consistency.

Measuring the Cream.—Immediately after mixing, the pipette is filled by placing its lower end in the cream and sucking at the upper end until the cream rises above the mark on the stem; then remove the pipette from the mouth and quickly close the tube at the upper end by firmly pressing the end of the fore-finger to prevent access of air. So long as this is done the cream cannot flow from the pipette. Holding the pipette in a perpendicular position, with the mark on a level with the eye, carefully relieve the pressure of the finger so as to admit air slowly to the space above the cream. In order to more easily control the access of air both the finger and end of the pipette should be dry. When the upper surface of the cream coincides with the mark upon the stem, the pressure should be again applied to stop the flow of cream. Next, place the point of the pipette in the mouth of one of the test bottles, and removing the finger allow the cream to flow into the bottle. After waiting a short time for the pipette to drain, blow into the upper end to expel the cream held in the point. If the pipette is not dry when used it should be filled with the cream to be tested, and this thrown away before taking the test sample.

Persons who have had no experience in the use of the pipette will do well to practice a short time by measuring water into a test bottle before attempting to make a test.

Adding the Acid.—After the cream has been measured into the test bottle the test may be proceeded with immediately, or the bottles may be left for a day or two without materially changing the results; samples that have remained in the test bottles two or three months and which had commenced to mould before the acid was added, have given the same amount of fat as samples tested immediately after being measured. If the cream has become coagulated, the curd should be broken up by shaking the test bottle before the acid is added. It is advisable, however, that the test be proceeded with immediately after the samples are measured, if possible.

The volume of commercial sulphuric acid required for a test is approximately the same as that of the cream, or 17.5 c. c. for the ordinary test. If too little acid is added, the casein is not all held in solution throughout the test, and an imperfect separation of the fat results. If too much acid is used, the fat itself is attacked. The acid need not be measured with great accuracy, as small variations will not affect the result.

Great care must be taken in handling the acid to avoid getting any of it upon the skin or clothing, as it is very corrosive. If by accident any is spilled upon the hands or clothes, it should be washed off immediately, using plenty of water. A prompt application of ammonia water to clothing upon which acid is spilled may prevent the destruction of the fabric and restore the color.

When all the samples of cream to be tested are measured ready for the test, the acid measure is filled to the 17.5 c. c. mark with sulphuric acid, and from this it is carefully poured into a test bottle containing the cream. The acid being much the heavier sinks directly to the bottom of the test bottle without mixing with the cream that floats upon it. The acid and cream should be *thoroughly mixed* together by gently shaking with a rotary motion. At first there is a precipitation of curd, but this rapidly dissolves. Much heat is evolved by the chemical action and the solution, at first nearly colorless, soon changes to a very dark brown, owing to the charring of the milk sugar.

Whirling the Bottles.—The test bottles containing the mixture of cream and acid should be placed in the machine and whirled directly after the acid is added. An even number of bottles should be whirled at the same time and they should be placed in the wheel in pairs opposite to each other, so that the equilibrium of the apparatus will not be disturbed. When all the test bottles are in the apparatus, the cover is placed upon the jacket and the

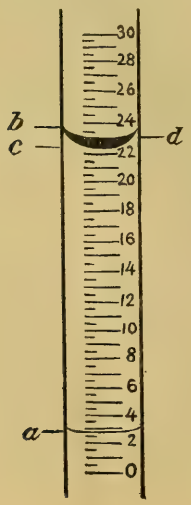
machine turned at the proper speed for about five minutes. The test should never be made without the cover being placed upon the jacket as this not only prevents the cooling of the bottles when they are whirled, but in case of the breakage of bottles, may protect the face and eyes of the operator from injury by pieces of glass or hot acid.

The machine should be frequently tested with the speed indicator to make certain that the bottles are whirled at the required speed. Too slow motion results in imperfect separation of butter-fat.

If a steam turbine is not used, the test bottles should be whirled immediately after adding the oil of vitriol. In case of delay they must be heated to a temperature of about 200° Fahr. before putting them in the machine.

Filling the bottles with hot water.—As soon as the bottles have been sufficiently whirled, they should be filled to the neck with hot water. If practicable, distilled or rain water should be used for the purpose. The bottles are most conveniently filled by help of the apparatus already described; the flow of water can be perfectly controlled by the pinch-cock upon the rubber tube. If only a few tests are to be made, the bottles may be filled with a pipette, or by pouring from a graduate. The cover should then be replaced and the machine turned for about two minutes. Hot water is now added to fill the test bottles nearly to the 28 per cent. mark, and after whirling for about one minute longer the fat is ready for measuring.

Fig. 4.



Measuring the fat.—The fat when measured should still be hot to the touch.

To measure the fat, hold the bottle in a perpendicular position with the scale on a level with the eye, observe the divisions which mark the highest and the lowest limits of the fat. The difference between these gives the per cent. of fat directly.

The line of division between the fat and the liquid beneath is nearly a straight line and no doubt need arise concerning the reading at this point, but the upper surface of the fat being concave, errors often occur by reading from the wrong place. The reading should be taken at the line where the upper surface of the fat meets the side of the tube and not from surface of fat in the center of the tube nor from the bottom of the dark line

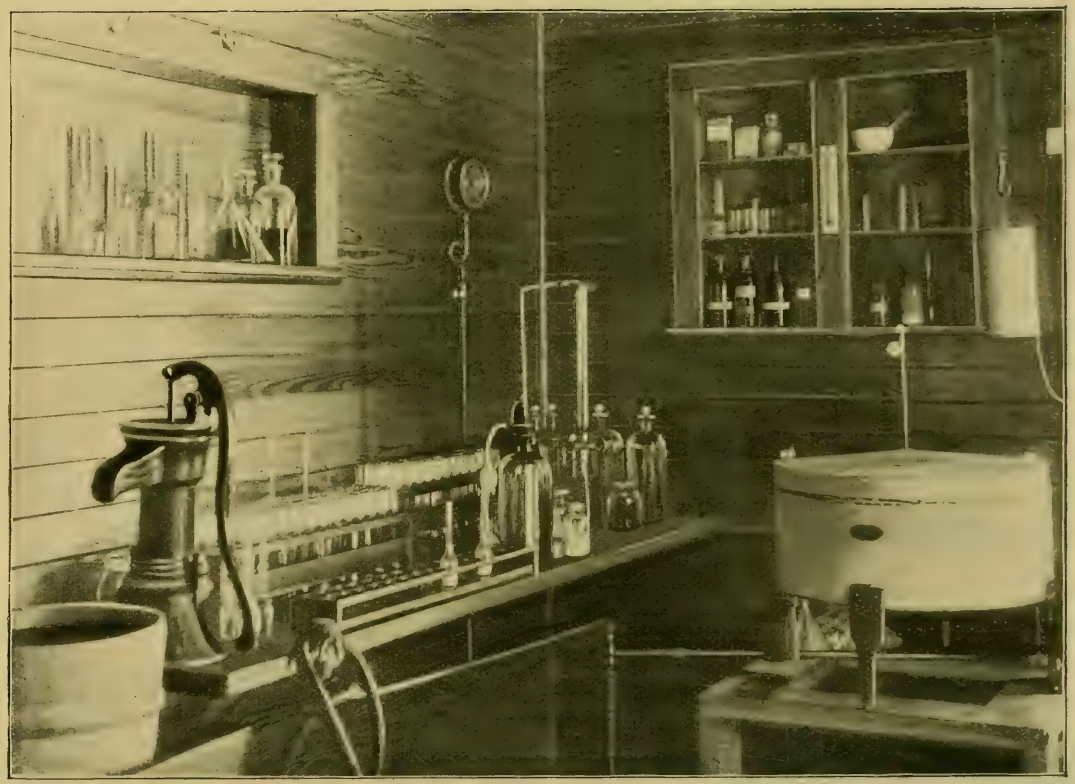


PLATE XV. Creamery Laboratory for Babcock Tests.

caused by the refraction of the curved surface. For instance in fig 4 the reading should be taken from *a* to *b* and not to *c* or *d*.

The reading may be made with less liability of error by measuring the length of the column of fat with a pair of dividers, one point of which is placed at the bottom and the other at the upper limit of the fat. The dividers are then removed and one point being placed at the 0 mark of the scale on the bottle used, the other will be at the per cent. of fat in the cream examined.

Sometimes bubbles of air collect at the upper surface of the column of fat and prevent a close reading; in such cases a few drops of strong alcohol (over 90 per cent.) put into the tube on top of the column of fat, will cause the bubbles to disappear and give a sharp line between the fat and alcohol for reading. Whenever alcohol is used for this purpose, the reading should be taken directly after the alcohol is added, as after it has stood for a time, the alcohol partially unites with the fat and increases its volume.

Whenever the fat is not quite clear, more satisfactory results may be obtained by allowing the bottles to stand until the fat has solidified and then warm them by placing the bottles in hot water, before taking the reading.

The way of reading is illustrated in the figure. The bottom of the clear yellow liquid fat layer is at *a*. The upper surface is represented by *b*, *c*, *d*. The readings are 2.75 and 23.75. The difference, 21.00, is the per cent. of fat in this sample of cream.

After satisfactory tests have been made on all the samples, the cream that remains in the sample bottles is thrown away.

Cleaning the Test Bottles.—If the fat has solidified by cooling, warm until it is melted. This may be done by replacing the bottles in the machine and turning on the steam, or by running hot water over the bottles from the apparatus already described. Give each bottle a quick motion so as to throw out the fat, then empty out the remainder of the liquid, shaking all the time to loosen the white sediment on the bottom. Fill to the brim with boiling water, and place in the rack to empty and drain. After wiping off the outside with a cloth, the tubes, although not perfectly clean, are free from fat and ready for use again.

The accompanying plate, Plate XV, shows a very convenient arrangement of the testing apparatus made by Mr. B. F. Case, manager of the Canton Creamery, at Canton Center, in this State.

To the right of the picture is a steam turbine apparatus carrying 50 test bottles, provided with a speed indicator. Above it

hangs a pail from which the hot water is drawn for filling the test bottles after whirling.

On the bench are racks for drying and storing the test bottles and pipettes and in front is a stand to hold the bottles while they are being filled.

At the right of this stand is a convenient apparatus for measuring the oil of vitriol into the test bottles.

At the extreme left is a sink for washing apparatus. The water can be quickly heated from the hose attached to the steam pipe. The cupboards above carry bichromate of potash and any other chemicals and apparatus which are desired.

PLATE XIII.

Plate XIII shows the method of storing the composite samples at the Canton Creamery. The closets, closing in front by doors hinged at the top, which can be securely locked, and communicating at the back with the cold storage room, are fitted with drawers, each devoted to a particular cream-gathering route. Each jar bears the number of one of the patrons and all samples of his cream are poured into it as soon as brought in.

Book Keeping of the Babcock Test System.

The pounds of cream collected from each patron are recorded from day to day and footed up at the end of the month, exactly as was done with spaces by the space system. The record of the Babcock tests are conveniently kept by themselves in a book or on blanks prepared for the purpose. Once a month the total pounds of cream furnished by each patron, and the average per cent. of fat in it, are posted in the ledger. Fractions of a pound are carried over to the next month and the percentages of fat are given to one place of decimals. The ledger is generally ruled with columns properly headed for names of patrons, numbers of patrons, pounds of cream, pounds of fat, average per cent. of fat, and finally the amount due, as shown below :

January, 1895.

No. of patron.	Name of patron.	Pounds of cream.	Average per cent. of fat.	Pounds of fat.	Payment at 30c per lb. of fat.
1	John Smith	1500	18.9	283.5	$85.05
2	James Jones	147	20.2	29.7	8.91
3	Henry Brown	963	14.0	134.8	40.44

This arrangement is compact and gives opportunity to foot up the total pounds of cream and fat received during the month by the creamery, and the total amount paid the patrons.

In the monthly report for distribution among the patrons details such as are on page 232 may be given.

Records of Five Connecticut Creameries Running on the Babcock Test System.

In the following table is given an abstract from the records of five creameries which have used the Babcock system of payment for from five to ten months, to the entire satisfaction of the creamery managers and nearly all of the patrons.

It will be noticed that while the average composition of the cream of all the patrons does not show very great fluctuations, from 16.9 to 19.8 per cent. of fat, the cream of certain patrons on certain days has contained as little as 9.5 per cent. of butter-fat and of other patrons has contained 30 per cent.

Under this system of payment however both those whose cream is exceptionally poor and those whose cream is exceptionally rich receive their fair share and only their fair share of the payments.

The pounds of cream required to make a pound of butter has varied between 4.18 and 5.02 and has averaged 4.54 lbs.

The lowest average per cent. of fat, 16.9 was during December at creamery A and it took more pounds of this cream, 5.02, than of any other to make a pound of butter. On the other hand the highest average per cent. of fat, 20.3, obtained during October at creamery D, corresponds with the lowest number of pounds of cream required to make a pound of butter, 4.18.

In general the poorer the cream in fat the more pounds it takes to make a pound of butter and *vice versa.*

The number of pounds of butter-fat in the cream required to make a pound of finished butter varied between .807 and .877 pound and averaged .841 pound.

		Pounds of Cream received.	Pounds of Fat received.	Per cent. of Fat in the Cream.			Pounds of Butter made.	Pounds of Cream to make a Pound of Butter.	Pounds of Fat to make a Pound of Butter.
				Average.	Highest.	Lowest.			
Creamery A.	March	20676	3787.1	18.3	24.7	12.0	4365	4.74	.868
	April	20832	3849.7	18.5	23 0	14.9	4384	*4.59	*.848
	May	27601	4919.8	17.8	25.1	16 9	5323	*4.92	*.877
	June	25757	4927.4	19.2	27.0	16.6	5426	*4.34	*.830
	July	20771	3920.4	18.9	28.0	15.9	4088	*4.30	*.808
	Aug.	19904	3793.6	19.1	30.0	16.6	4084	*4.54	*.865
	Sept.	18148	3421.0	18.8	28.3	14.8	3935	*4.49	*.847
	Oct.	17144	3209.0	18.7	26.4	15.3	3886	4.41	.826
	Nov.	17694	3082.7	17.4	20.4	12.0	3626	4.88	.850
	Dec.	17971	3037.3	16.9	23.3	9.5	3582	5.02	.848
Creamery B.	June	57440	11113.	19.3	24.3	15.0	12841	4.47	.865
	July	45412	8769.	19.3	23.7	15.0	10642	4.27	.824
	Aug.	33077	6416.	19.4	23.8	14.3	7573	4.37	.847
	Sept.	28959	5684.	19.6	24.7	14.0	6571	4.41	.865
	Oct.	31155	6169.	19.8	24.0	15.8	7085	4.40	.871
Creamery C.	July	60190	11222.5	18.6	23.5	9.5	13346	4.51	.841
	Aug.	55568	10142.5	18.3	25.5	12.5	12367	4.49	.820
	Sept.	44453	8355.7	18.8	26.0	12.5	9623	4 62	.868
	Oct.	47005	8861.8	18.8	24.5	11.8	10665	4.41	.831
	Nov.	40399	6946 5	17.2	22.3	12.8	8609	4.69	.807
	Dec.	42665	7280.6	17.1	21.5	10.0	8804	4.85	.827
Creamery D.	Aug.	53938	10380.9	19.2	26.5	15.3	12100	4.46	.858
	Sept.	50161	9684.2	19.3	25.6	15.4	11398	4.40	.850
	Oct.	53022	10770.9	20.3	25.3	14.6	12692	4.18	.849
	Nov.	48890	9396.4	19.2	24.1	12.8	11244	4.35	.836
	Dec.	50365	9740.3	19.3	24.5	10.2	11569	4.35	.842
Creamery E.	Aug.	55029	9430.8	17.1	21.8	12.2	11191	4.92	.843
	Sept.	45633	8018.7	17.6	24.1	14.0	9884	4.62	.811
	Oct.	54730	9926.9	18.1	23.2	13.2	12204	4.48	.813
	Nov.	46668	8201.0	17.6	23.0	14.1	9953	4.69	.824
	Dec.	51646	8991.0	17.4	21.2	13.5	10923	4.73	.823

* After allowing for cream sold.

Comparison of the Space System and the Babcock System of Payment at Six Creameries.

The comparisons of the two systems here given, were made at the request of the Superintendent or the President of each of the respective creameries. The six creameries used the Cooley system exclusively. Creameries Nos. 1 and 2, allow the patrons during the winter time to do the skimming themselves every other day, or in some cases oftener. At creameries Nos. 3 and 5, the skimming and the counting of spaces is all done by the cream-gatherers, except on Sundays when it is done by the patrons. The patrons of creameries Nos. 4 and 6, do all of the skimming and count their own spaces.

At the creameries where tests were made of a single gathering, a representative of the Station went with the cream-gatherer over his route, witnessed the skimming (when done by the cream-gatherer), and weighed and sampled the cream. The samples were tested by the Station agent at the creamery. In the week's trial at creamery No. 4, the composite system as here described was followed, all the work except the testing being done by the creamery. Details of the tests are given in tables on pages 236 to 244. To facilitate their study, the following explanations are given :

The first column gives the numbers which represent the individual patrons.

Spaces of Cream.—The second column gives the spaces credited to each, which is the basis of payment by the space system.

Pounds of Cream and per cent. of Fat in the Cream.—The third and fourth columns,—pounds of cream and per cent. of butter-fat in the cream,—furnished the data for calculating the quantity of butter-fat to be credited to each patron.

It should be noticed that, from the number of spaces and the total weight of "cream" given in the tables, it is not possible to calculate the average weight of a space accurately, because some cream-gatherers or patrons "draw closer" than others, that is, draw off more of the skim-milk from the cream, after measuring the spaces.

In any case some skim-milk is gathered with the cream, and in some cases much more than in others. Again, if the gatherer draws equally "close" from each can, still a larger proportion of skim-milk will go with the cream from a can which is half full than from one which is full.

The number of spaces of cream of course is not changed, however much skim-milk is poured with it into the cream carrier. Nor on the other hand, is the quantity of butter-fat, credited to the patron by the Babcock System, made either larger or smaller by the amount of skim-milk that is weighed with the cream, for the more skim-milk that is added, the lower will be the per cent. of butter-fat shown by the test.

For instance, suppose a patron has 50 pounds of cream which would test 25 per cent. butter-fat, and hence would credit him with 12½ pounds of butter-fat, and suppose he mixes with it 25 pounds of skim-milk so that the cream-gatherer credits him with 75 pounds of cream instead of fifty. He gains nothing, for the Babcock test will only show 16.7 per cent. of fat in this mixture, which is equivalent to 12½ pounds of fat, the same that would be credited from 50 pounds of rich cream.

Per cent. of Fat in the Cream.—It follows from the explanation just given that the per cent. of fat in the total quantity of cream weighed is *of itself* no accurate index of the relative value to the creamery of each patron's cream.

The gatherer may have skimmed one patron's cream much closer than another's, that is, he may have taken with the cream in one case more skim-milk than in another.

Pounds of Fat in the Cream.—The fifth column (calculated from the two preceding columns), is the basis of payment by the Babcock System. It is not butter but butter-fat, the essential ingredient of butter.*

The other columns of the table are those which deserve the careful study of every manager and patron of a cream-gathering creamery, for they furnish a comparison of the two systems, and show moreover just what is the state of things in the present creamery practice of Connecticut.

Pounds of Fat in 100 "Spaces" of Cream.—This column shows the relative value of the "spaces" taken from the different patrons. Notice in Table I, for example, that while 100 "spaces" of cream from Patrons Nos. 5, 8, 18 and 19 furnish to the creamery 15 pounds or more of pure butter-fat, 100 spaces of cream from Patrons Nos. 12, 15 and 21 supply not more than 11½ pounds.

* Butter is a mixture of some 80 to 90 per cent. of pure butter-fat with variable quantities of water, salt and curd.

Spaces of Cream required to make a Pound of Average Butter.—This column expresses in a more popular, but less accurate way, the facts given in the preceding column. Butter in each case is assumed to contain 85 per cent. of butter-fat.

Referring again to Table I, there is seen abundant illustration of the trouble which is spoken of at every dairymen's meeting. Patrons 5, 8, 18 and 19 furnished cream which required less than 6 spaces to make a pound of butter, while $7\frac{1}{4}$ to 8 spaces of the cream from Patrons 12, 15 and 21 were required to make a pound of butter.

The next two columns show *the Payment for the Cream by the Space System* at 4 cents per space, and *Payment for the Cream by the Babcock Test System* at 28+cents per pound of butter-fat.

The price per pound of fat given, was obtained by dividing the sum of the amounts paid each patron by the total number of pounds of fat from his cream. The number of pounds of fat in each patron's cream was multiplied by this price per pound, thus giving the price paid for his cream. The columns which give the cost of the cream by the two systems, both foot up to the same amount in dollars and cents.

These columns give the amounts each man would receive if the same total amount of money was distributed by the two systems.

Percentage difference.—In the last column, the difference in the payment by the two systems, is given in per cents. Those with + sign would receive more by the test system; those with the — sign less. Supposing, for example, the percentage difference for a patron is + 10, then that patron would receive by the Babcock test system $110.00, where he gets by the space system $100.00, but if — 10, then he would receive only $90.00 by the Babcock test system when by the space system he would receive $100.

In this connection should be mentioned the fact that the purchase of a Babcock tester and the drawing of samples of cream in the presence of patrons has in some cases made a very noticeable change in the quality and quantity of cream furnished.

The superintendent of one of our creameries reports that, during the week immediately following the taking of samples for testing at the creamery, the number of spaces of cream charged to the creamery notably diminished, but at the same time the output of butter increased. The Babcock test, before its adoption as a basis for payment, had paid for itself in this way.

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 1, Feb. 15 and 16, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter. (85 per cent. Butter-fat.)	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System @ $29\frac{3}{10}\frac{3}{0}$ cts. per Pound of Fat.	Payment by the Babcock Test System would give more (+) or less (—) than by the Space System in per cent.
1†	46	31.00	20.50	6.36	13.8	6.15	$1.84	$1.90	+ 3.3
2†	46	32.00	20.25	6.48	14.1	6.03	1.84	1.94	+ 5.4
3†	93	61.00	22.50	13.72	14.8	5.76	3.72	4.10	+10.2
4†	32	21.50	21.75	4.68	14.6	5.81	1.28	1.40	+ 9.4
5†	46	31.25	22.50	7.03	15.3	5.55	1.84	2.11	+14.7
6†	34	22.25	20.50	4.56	13.4	6.34	1.36	1.37	+ .8
7†	53	35.50	19.25	6.83	12.9	6.60	2.12	2.05	— 3.3
8†	40	27.75	22.00	6.11	15.3	5.56	1.60	1.83	+14.4
9 *	42	29.00	19.75	5.73	13.7	6.23	1.68	1.72	+ 2.4
9 †	42	31.75	17.50	5.57	13.3	6.41	1.68	1.67	— .6
10 *	30	23.75	17.25	4.10	13.7	6.22	1.20	1.23	+ 2.5
10 †	29	21.00	17.50	3.68	12.7	6.69	1.16	1.10	— 5.2
11 *	48	36.00	18.00	6.48	13.5	6.28	1.92	1.94	+ 1.0
11 †	46	35.75	17.50	6.26	13.6	6.24	1.84	1.87	+ 1.6
12 *	----	----	----	----	----	----	----	----	----
12 †	15	12.75	12.50	1.59	10.6	8.02	.60	.48	—20.0
13 *	37	26.00	17.50	4.55	12.3	6.91	1.48	1 36	— 8.1
13 †	36	27.50	18.00	4.95	13.7	6.18	1.44	1.48	+ 2.8
14 *	27	21.50	16.50	3.56	13.2	6.45	1.08	1.07	— .9
14 †	26	21.75	17.00	3.70	14.2	5.97	1.04	1.11	+ 6.7
15 *	40	28.50	16.00	4.56	11.4	7.46	1.60	1.37	—14.4
15 †	39	27.75	17.00	4.72	12.1	7.03	1.56	1.41	— 9.6
16 *	19	14.50	16.75	2.43	12.8	6.65	.76	.73	— 3.8
16 †	18	14.75	17.00	2.51	13.9	6.10	.72	.75	+ 4.1
17 *	22	16.00	17.00	2.72	12.3	6.88	.88	.81	— 8.0
17 †	24	17.75	16.25	2.88	12.0	7.08	.96	.86	—10.4
18 *	25	16.00	18.75	3.00	12.0	7.07	1.00	.90	—10.0
18 †	21	17.00	18.50	3.15	15.0	5.67	.84	.94	+11.9
19 *	14	11.00	18.00	1.98	14.1	6.01	.56	.59	+ 5.4
19 †	15	14.00	17.80	2.49	16.6	5.12	.60	.74	+23.3
20 *	37	28.00	18.30	5.12	13.8	6.14	1.48	1.53	+ 3.4
20 †	36	26.50	18.80	4.98	13.8	6.14	1.44	1.49	+ 3.5
21 *	69	52.00	15.50	8.06	11.7	7.27	2.76	2.41	—12.7
21 †	70	54.00	15.00	8.10	11.5	7.35	2.80	2.42	—13.6
Total	1217			162.64			$48.68	$48.68	

* Skimmed and spaces counted by patron.

† Skimmed and spaces counted by cream-gatherer.

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 2, Feb. 21, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter.	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System at $29\frac{65}{100}$ cts. per Pound of Fat.	Payment by the Babcock Test System would give more (+) or less (−) than by the Space System in per cent.
1	18	13.25	15.75	2.09	11.6	7.32	$ .72	$ .62	−13.9
2	30	23.50	19.00	4.47	14.9	5.70	1.20	1.33	+10.8
3	90	64.75	19.00	12.30	13.7	6.21	3.60	3.65	+ 1.4
4	18	15.00	12.50	1.88	10.4	8.14	.72	.56	−22.2
5	22	16.50	15.50	2 56	11.6	7.30	.88	.76	−13.6
6	36	21.75	23.00	5.00	13.9	6.12	1.44	1.48	+ 2.8
7	17	12.75	19.25	2.45	14.4	5.87	.68	.73	+ 7.4
8	77	57.00	21.00	11.97	15.5	5.47	3.08	3.55	+15.2
9	18	15.25	12.75	1.94	10.8	7.88	.72	.58	−19.4
10	59	45.00	17.25	7.76	13.1	6.46	2.36	2.30	− 2.5
11	21	19.75	18.00	3.56	17.0	5.01	.84	1.06	+26.2
12	52	41.50	16.00	6.64	12.8	6.66	2.08	1.97	− 5.3
13	68	58.25	18.75	10.92	16.1	5.29	2.72	3.24	+19.1
14	15	17.50	12.50	2.18	14.5	5.85	.60	.65	+ 8.0
15	109	84.75	18.75	15.89	14.6	5.83	4.36	4.72	+ 8.2
16	53	46.50	18.00	8.37	15.8	5.37	2.12	2.48	+17.0
17	47	39.75	16.00	6.36	13.5	6.28	1.88	1.89	+ .5
18	34	25.00	17.00	4.25	12.5	6.80	1.36	1.26	− 7.3
19	161	135.50	14.00	18.97	11.8	7.22	6.44	5.62	−12.7
20	9	10.00	13.50	1.35	15.0	5.67	.36	.40	+11.1
21	16	17.00	11.50	1.96	12.2	6.97	.64	.58	− 9.4
22	38	28.50	16.75	4.77	12.5	6.77	1.52	1.41	− 7.2
23	49	37.50	17.00	6.38	13.0	6.53	1.96	1.89	− 3.5
24	35	27.00	16.75	4.52	12.9	6.58	1.40	1.34	− 4.3
25	8	8.00	7.25	.58	7.2	11.72	.32	.17	−46.9
26	47	33.00	15.25	5.03	10.7	7.94	1.88	1.49	−20.8
27	49	37.75	16.75	6.32	12.9	6.60	1.96	1.87	− 3.5
28	25	20.00	13.50	2.70	10.8	7.87	1.00	.80	−20.0
29	21	16.75	13.00	2.18	10.4	8.20	.84	.64	−23.8
30	27	21.75	18.75	4.08	15.1	5.62	1.08	1.21	+12.0
31	95	48.00	17.00	8.16	12.5	6.77	2.60	2.42	− 6.9
32	109	80.75	19.25	15.55	14.2	5.96	4.36	4.61	+ 5.7
34	160	124.75	18.50	23.08	14.4	5.90	6.40	6.84	+ 6.9
Total	1603			216.22			$64.12	$64.12	

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 3, Route A, Feb. 22, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter.	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System @ $28\frac{94}{100}$ cts. per Pound of Fat.	Payment by the Babcock Test System would give more (+) or less (−) than by the Space System in per cent.
20	73	59.00	12.75	7.52	10.3	8.25	$2.92	$2.18	−25.3
21	13	11.50	17.50	2.01	15 5	5.50	.52	.58	+11.5
22	48	39.75	18.00	7.16	14.9	5.70	1.92	2.07	+ 7.8
23	34	29.00	15.00	4.35	12.8	6.64	1.36	1.26	− 7.4
24	16	13.75	15.25	2.10	13.1	6.48	.64	.61	− 4.7
25	50	40.00	18.75	7.50	15.0	5.67	2.00	2.17	+ 8.5
26	29	23.25	18.25	4.24	14.6	5.80	1.16	1.23	+ 6.0
27	24	18.25	18.50	3.38	14.1	6.03	.96	.98	+ 2.1
28	7	6.00	18.50	1.11	15.9	5.36	.28	.32	+14.3
29	36	28.50	17.00	4.85	13.5	6.31	1.44	1.40	− 2.8
30	32	24.25	19.00	4.61	14.4	5.90	1.28	1.34	+ 4.7
31	18	13.50	19.50	2.63	14.6	5.81	.72	.76	+ 5.5
32	37	26.25	20.00	5.25	14.2	5.99	1.48	1.52	+ 2.7
33	30	24.50	18.50	4.53	15.1	5.63	1.20	1.31	+ 9.1
34	28	22.25	17.50	3.89	13.9	6.12	1.12	1.13	+ 0.9
35	34	26.00	16.00	4.16	12.2	6.94	1.36	1.20	−11.8
36	33	25.00	17.25	4.31	13.1	6.50	1.32	1.25	− 5.3
37	16	15.25	17.25	2.63	16.4	5.17	.64	.76	+18.8
38	32	23.50	19.75	4.64	14.5	5.86	1.28	1.34	+ 4.7
39	23	18.00	18.25	3.29	14.3	5.94	.92	.95	+ 3.3
40	22	18.00	18.25	3.29	15.0	5.68	.88	.95	+ 7.9
41	19	15.75	17.50	2.76	14.5	5.85	.76	.80	+ 5.3
42	21	15.25	18.75	2.86	13.6	6.26	.84	.83	− 1.2
43	98	78.25	18.50	14.48	14.8	5.75	3.92	4.19	+ 6.9
44	8	6.75	16.50	1-11	13.9	6.13	.32	.32	0.0
45	64	48.00	18.50	8.88	13.9	6.13	2.56	2.57	+ 0.4
46	74	54.50	17.00	9.27	12.5	6.79	2.96	2,68	− 9.5
47	26	19.75	19.25	3.80	14.6	5.82	1.04	1.10	+ 5.8
Total	945			130.61			$37.80	$37.80	

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 3, Route B, Feb. 22, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a Pound of average Butter.	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System @ $28\frac{1.6}{100}$ cts. per pound of Fat.	Payment by the Babcock Test System would give more (+) or less (—) than by the Space System in per cent.
1	21	15.50	17.75	2.75	13.1	6.49	$ .84	$ .77	— 8.3
2	98	75.00	17.25	12.94	13.2	6.44	3.92	3.64	— 7.1
3	87	71.25	16.50	11.76	13.5	6.29	3.48	3.31	— 4.9
4	29	23.50	16.00	3.76	13.0	6.55	1.16	1.06	— 8.6
5	19	15.25	15.75	2.40	12.6	6.71	.76	.68	—10.5
6	19	11.50	24.00	2.76	14.5	5.85	.76	.78	+ 2.6
7	22	15.75	19.75	3.11	14.1	6.01	.88	.88	0.0
8	6	6.00	18.00	1.08	18.0	4.72	.24	.30	+25.0
9	7	6.50	14.00	.91	13.0	6.53	.28	.26	— 7.1
10	24	21.00	18.75	3.94	16.3	5.18	.96	1.11	+15.6
11	29	21.00	16.75	3.52	12.1	7.00	1.16	.99	—14.7
12	42	28.25	24.25	6.85	16.3	5.22	1.68	1.93	+14.9
13	10	9.00	18.50	1.67	16.7	5.10	.40	.47	+17.5
14	18	14.25	18.25	2.60	14.4	5.88	.72	.73	+ 1.4
15	38	30.00	20.00	6.00	15.8	5.38	1.52	1.69	+11.2
16	12	10.50	18.25	1.92	16.0	5.31	.48	.54	+12.5
17	25	19.00	19.25	3.66	14.6	5.80	1.00	1.03	+ 3.0
18	36	26.25	19.50	5.12	14.2	5.98	1.44	1.44	0.0
19	22	16.00	21.00	3.36	15.3	5.57	.88	.95	+ 8.0
Total	564			80.11			$22.56	$22.56	

Comparison of the Space and Babcock Test Systems for One Gathering.*

Creamery No. 4, Feb. 2, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a Pound of average Butter.	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System @ $30\frac{98}{100}$ cts. per Pound of Fat.	Payment by the Babcock Test System would give more (+) or less (−) than by the Space System in per cent.
1	28	20.7	15.75	3.27	11.7	7.28	$1.12	$1.01	− 9.9
2	55	39.8	17.50	6.96	12.6	6.72	2.20	2.16	− 1.8
3	108	80.5	17.50	14.09	13.0	6.51	4.32	4.36	+ .9
4	115	93.6	17.50	16.38	14.2	5.97	4.60	5.08	+10.4
5	53	41.0	17.50	7.18	13.5	6.27	2.12	2.22	+ 4.7
6	69	55.8	15.50	8.64	12.5	6.79	2.76	2.68	− 2.9
7	128	88.5	18.00	15.93	12.4	6.83	5.12	4.94	− 3.5
8	29	26.0	14.00	3.64	12.6	6.77	1.16	1.13	− 2.6
9	107	74.8	18.50	13.83	12.9	6.58	4.28	4.28	0.0
10	37	29.1	17.25	5.02	13.6	6.26	1.48	1.55	+ 4.7
11	15	10.5	14.00	1.47	9.8	8.74	.60	.46	−23.3
12	135	100.0	14.25	14.25	10.5	8.05	5.40	4.42	−10.0
14	91	68.8	19.25	13.23	14.6	5.85	3.64	4.10	+12.6
16	51	41.7	17.00	7.09	13.9	6.11	2.04	2.20	+ 7.8
17	25	21.5	18.50	3.98	15.9	5.34	1.00	1.23	+23.0
18	29	21.5	15.50	3.33	11.5	7.40	1.16	1.03	−11.2
19	56	39.5	15.50	6.12	10.9	7.78	2.24	1.89	−15.1
20	96	60.3	18.25	11.00	11.5	7.42	3.84	3.41	−11.2
21	90	61.2	22.50	13.78	15.3	5.55	3.60	4.26	+18.4
22	29	23.0	16.50	3.80	13.1	6.49	1.16	1.18	+ 1.7
23	40	28.1	14.00	3.94	9.8	8.63	1.60	1.22	−23.8
24	27	20.0	17.00	3.40	12.6	6.75	1.08	1.05	− 2.8
25	68	48.3	20.00	9.66	14.2	5.98	2.72	2.99	+10.0
27	48	36.0	13.75	4.95	10.3	8.24	1.92	1.53	−20.3
28	9	6.0	12.75	.77	8.5	9.94	.36	.24	−33.3
33	100	68.0	23.25	15.81	15.8	5.38	4.00	4.90	+22.5
Total	1638			211.52			$65.52	$65.52	

* The numbers of patrons in this table represent the same persons as the corresponding numbers in the table on page 241.

Comparison of the Space and Babcock Test Systems for One Week.*

Creamery No. 4, Feb. 12 to 19, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a Pound of average Butter.	Value of the Cream by the Space System @ 4 cts. per Space.	Value of the Cream by the Babcock Test System @ $31\frac{23}{100}$ cts. per Pound of Fat.	Payment by the Babcock Test System would give more (+) or less (—) than by the Space System in per cent.
1	82	62.75	17.00	10.67	13.0	6.53	$3.28	$3.33	+ 1.5
2	188	141.00	15.50	21.86	11.6	7.31	7.52	6.83	— 9.2
3	396	299.75	16 00	47.96	12.1	7.02	15.84	14.98	— 5.4
4	400	330.75	16.00	52.92	13.2	6.42	16.00	16.52	+ 3.3
5	282	240.25	16.50	39.64	14.1	6.04	11.28	12.38	+ 9.7
6	282	233.75	16.50	38.57	13.7	6.21	11.28	12.05	+ 6.8
7	423	294.00	16.50	48.51	11.4	7.41	16.92	15.16	—10.4
8	98	82.50	14.00	11.55	11.8	7.21	3.92	3.61	— 7.9
9	414	277.25	18.00	49.90	12.1	7.05	16.56	15.59	— 5.9
10	125	93.25	17.50	16.32	13.0	6.51	5.00	5.10	+ 2.0
11	47	31.25	14.00	4.38	9.3	9.12	1.88	1.37	—27.1
12	444	334.50	17.00	56.86	12 8	6.63	17.76	17.76	00.0
13	70	56.00	17.00	9.52	13.6	6.25	2.80	2.97	+ 6.1
14	341	247.75	20.25	50.17	14.7	5.77	13.64	15.67	+14 9
15	78	60.75	11.00	6.68	8.5	9.92	3.14	2.09	—33.4
16	144	115.25	17.25	19.88	13.8	6.16	5.76	6.21	+ 7.8
17	95	78.00	15.25	11.89	12.5	6.79	3.80	3.71	— 1.9
18	100	82.50	15.50	12.79	12.8	6.65	4.00	3.99	— 0.2
19	194	138.25	17.00	23.50	12.1	7.01	7.76	7.34	— 5.4
20	302	201.25	17.00	34.21	11.3	7.50	12.08	10.69	—11.5
21	400	271.00	22.00	59.62	14.9	5.70	16.00	18.63	+16.5
22	120	87.00	17.00	14.79	12.3	6.90	4.80	4.62	— 3.7
23	99	68.50	15.25	10.45	10.5	8.05	3.96	3.26	—17.7
24	86	66.00	17.75	11.71	13.6	6.24	3.44	3 66	+ 6.4
25	333	230.50	19.25	44.37	13.3	6.38	13.32	13.86	+ 4.1
26	113	81.75	19.50	15.94	14 1	6.03	4.52	4.98	+10.2
27	134	103.25	15.50	16.00	11.9	7.12	5.36	5.00	— 6.7
28	56	38.75	14.25	5.52	9.9	8.62	2.24	1.72	—23.2
33	100	66.00	24 50	16.17	16.2	5.25	4.00	5.05	+26.2
35	51	38.50	14.50	5.58	10.9	7.77	2.00	1.74	—14.7
	5997			767.93			$239.88	$239.88	

* See foot note, page 240.

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 5, April 23, 1891.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter.	Value of the Cream by the Space System (@ 4 cents per Space.	Value of the Cream by the Babcock Test System (@ 27 92/100 cents per pound of Fat.	Payment by the Babcock Test System would give more (+) or less (—) than by the Space System.
1	38	27.25	20.6	5.61	14.8	5.76	$1.52	$1.56	+ 2.6
2	28	22.00	20.3	4.47	15.9	5.32	1.12	1.25	+11.6
3	27½	19.50	20.7	4.04	14.7	5.78	1.10	1.13	+ 2.7
4	14	10.25	22.2	2.27	16.2	5.24	.56	.63	+12.5
5	24½	15.00	23.4	3.51	14.3	5.93	.98	.98	0.0
6	55	34.00	21.5	7.31	13.3	6.39	2.20	2.04	— 7.3
7	31⅓	21.75	19.8	4.31	13.7	6.21	1.26	1.20	— 4.8
8	20	11.75	20.4	2.40	12.0	7.08	.80	.67	—16.3
9	52	36.50	21.0	7.67	14.8	5.76	2.08	2.14	+ 2.9
10	11	7.50	23.7	1.78	16.2	5.25	.44	.50	+13.6
11	59	42.25	19.2	8.11	13.7	6.18	2.36	2.27	— 3.8
12	16½	11.50	20.7	2.38	14.4	5.89	.66	.66	0.0
13	29	20.75	18.9	3.92	13.5	6.29	1.16	1.09	— 6.0
14	16	11.25	20.1	2.26	14.1	6.02	.64	.63	— 1.6
15	50	34.75	19.8	6.88	13.8	6.18	2.00	1.93	— 3.5
16	26	18.75	21.0	3.94	15.2	5.61	1.04	1.10	+ 5.8
17	37	24.50	19.1	4.68	12.6	6.72	1.48	1,31	—11.5
18	26	18.25	21.3	3.89	14.9	5.68	1.04	1.09	+ 4.8
19	29	20.00	20.7	4.14	14.3	5.95	1.16	1.15	— .9
20	32	21.75	23.3	5.07	15.9	5.36	1.28	1.41	+10.1
21	68	48.50	20.7	10.04	14.8	5.75	2.72	2.81	+ 3.3
22	42	29.75	20.4	6.07	14.4	5.88	1.68	1.70	+ 1.2
23	22½	16.00	21.0	3.36	14.9	5.69	.90	.94	+ 4.4
24	15½	10.25	21.5	2.20	14.2	5.99	.62	.61	— 1.6
	770			110.31			$30.80	$30.80	

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 5, April 17, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter.	Value of the Cream by the Space System @ 4 cents per Space.	Value of the Cream by the Babcock Test System @ $28\frac{15}{100}$ cents per pound of Fat.	Payment by the Babcock Test System would give more (+) or less (—) than by the Space System.
1	22	15.50	19.50	3.02	13.6	6.19	$ .88	$ .87	— 1.1
2	38	25.75	18.75	4.83	12.7	6.69	1.52	1.38	— 9.2
3	23	16.25	19.50	3.17	13.7	6.17	.92	.91	— 1.1
4	20	14.25	20.00	2.85	14.1	5.97	.80	.82	+ 2.5
5	19	14.50	18.00	2.61	13.7	6.18	.76	.75	— 1.3
6	42	30.75	19.50	6.00	14.3	5.95	1.68	1.72	+ 2.4
7	18	14.00	18.50	2.59	14.3	5.90	.72	.74	+ 2.8
8	22	17.75	18.75	3.33	15.1	5.61	.88	.96	+ 9.1
9	49	35.00	19.75	6.91	14.0	6.03	1.96	1.98	+ 1.0
10	47	32.00	20.25	6.48	13.8	6.17	1.88	1.86	— 1.1
11	60	46.75	16.50	7.71	12.9	6.61	2.40	2.21	— 7.9
12	15	11.75	18.75	2.20	14.7	5.80	.60	.63	+ 5.0
13	146	101.50	20.50	20.81	14.1	5.96	5.84	5.96	+ 2.1
14	26	18.00	20.25	3.65	14.0	6.06	1.04	1.05	+ .9
15	24	16.50	19.75	3.26	13.6	6.25	.96	.93	— 3.1
16	33	22.25	21.75	4.84	14.7	5.80	1.32	1.39	— 5.3
17	32	22.00	17.50	3.85	12.0	7.07	1.28	1.10	—14.1
18	19	13.50	19.25	2.60	13.7	6.21	.76	.74	— 2.6
19	20	15.00	20.00	3.00	15.0	5.67	.80	.86	+ 7.5
20	30	21.25	21.25	4.52	15.1	5.64	1.20	1.29	+ 7.5
21	33	24.00	20.25	4.86	14.8	5.77	1.32	1.39	+ 5.3
22	39	28.50	19.75	5.63	14.4	5.88	1.56	1.61	+ 3.2
23	25	17.75	18.25	3.24	12.9	6.56	1.00	.93	— 7.0
24	57	42.75	19.50	8.34	14.6	5.81	2.28	2.39	+ 4.8
25	72	52.25	17.00	8.88	12.3	6.89	2.88	2.55	—11.5
26	23	21.25	16.00	3.40	14.8	5.75	.92	.97	+ 5.4
27	35	25.50	20.50	5.23	14.9	5.69	1.40	1.50	+ 7.1
28	23	17.00	17.00	2.89	12.6	6.76	.92	.83	— 9.8
29	17	12.50	16.50	2.06	12.1	7.01	.68	.59	—13.2
30	85	65.00	19.50	12.68	14.9	5.70	3.40	3.63	+ 6.8
31	27	19.25	20.00	3.85	14.3	5.96	1.08	1.10	+ 1.9
	1141			159.30			$45.64	$45.64	

Comparison of the Space and Babcock Test Systems for One Gathering.

Creamery No. 6, April 18, 1894.

Number of Patron.	Spaces of Cream.	Pounds of Cream.	Per cent. of Fat in the Cream.	Pounds of Fat in the Cream.	Pounds of Fat in 100 Spaces of Cream.	Number of Spaces to make a pound of average Butter.	Value of the Cream by the Space System @ 4 cents per Space.	Value of the Cream by the Babcock Test System @ $31\frac{43}{100}$ cents per pound of Fat.	Payment by the Babcock Test System would give more (+) or less (−) than by the Space System.
1	26	17.5	15.75	2.76	10.6	8.01	$1.04	$ .87	−16.3
2	30	21.0	19.00	3.99	13.3	6.39	1.20	1.25	+ 4.2
3	40	27.5	17.00	4.68	11.7	7.26	1.60	1.47	− 8.1
4	43	27.0	19.00	5.13	11.9	7.14	1.72	1.61	− 6.4
5	24	18.0	19.25	3.47	14.5	5.88	.96	1.09	+13.5
6	34	23.0	18.50	4.26	12.5	6.80	1.36	1.34	− 1.5
7	31	21.5	15.75	3.39	10.9	7.79	1.24	1.07	−13.7
8	15	12.5	17.00	2.13	14.2	6.00	.60	.67	+11.6
9	19	17.0	16.00	2.72	14.3	5.94	.76	.85	+11.8
10	33	26.0	16.25	4.21	12.8	6.67	1.32	1.32	0.0
11	32	25.0	19.00	4.75	14.8	5.72	1.28	1.49	+16.4
12	58	36.0	20.25	7.29	12.6	6.76	2.32	2.29	− 1.3
13	67	42.0	21.00	8.82	13.2	6.46	2.68	2.77	+ 3.4
14	55	38.5	19.50	7.51	13.7	6.22	2.20	2.36	+ 7.3
15	20	15.0	16.50	7.48	12.4	6.86	.80	.78	− 2.5
16	42	30.0	19.50	5.85	13.9	6.10	1.68	1.84	+ 9.5
17	30	21.5	18.25	3.92	13.1	6.51	1.20	1.23	+ 2.5
18	22	14 0	19.00	2.66	12.1	7.03	.88	.84	− 4.5
19	23	17.0	17.00	2.89	12.6	6.76	.92	.91	− 1.1
20	57	40.5	17.25	6.99	12.3	6.93	2.28	2.20	− 3.5
21	17	12.0	16.00	1.92	11.3	7.52	.68	.60	−11.7
22	24	17.0	13.50	2.30	9.6	8.87	.96	.72	−25.0
24	40	29.0	18.50	5.37	13.5	6.33	1.60	1.70	+ 6.2
25	62	42.0	17.00	7.14	11.5	7.38	2.48	2.25	− 9.3
26	44	38.0	16.75	6.37	14.5	5.87	1.76	2.00	+13.6
Total	888			113.00			$35.52	$35.52	

OBSERVATIONS ON THE GROWTH OF MAIZE CONTINUOUSLY ON THE SAME LAND.

By E. H. Jenkins.

In the years 1888 and 1889 a parcel of land containing 1⅛ acres which had been a meadow for some years previous, was dressed with commercial fertilizers and planted to corn. Fertilizers and crops were weighed and analyzed each year and the enrichment or exhaustion of the soil by the dressing and cropping were determined as accurately as possible.

In the spring of 1890 this land was divided into four strips, each containing three-tenths of an acre, and was dressed as shown in the following diagram.

South.		North.
	Plot A.—Cow Manure at the rate of 10 cords per acre.	
	Plot B.—Hog Manure at the rate of 13½ cords per acre.	
	Plot C.—Fertilizer Chemicals at the rate of 1700 pounds per acre.	
	Plot D.—No manure or fertilizer of any kind.	

Corn was planted in drills four feet apart and the stalks stood singly at distances of ten inches in the drill. The crop from each plot was separately weighed and analyzed.

The several plots have received the same dressing as in 1890 annually since that time, have been planted with the same variety of seed and have been under the same conditions of planting, cultivation and harvesting.

Full particulars regarding the details of the experiment and the results obtained from year to year will be found in the Reports of this Station for 1890, pages 183 to 194; 1891, pages 139 to 149; 1892, pages 122 to 129; 1893, pages 286 to 300.

The experiment was repeated in 1894 precisely as in the four years previous.

The time and method of plowing, planting, cultivating, and harvesting was essentially the same as in previous years.

Considering simply the gross amounts of nitrogen, phosphoric acid and potash which the dressing added to the soil of the several plots and those which the crops removed, it appears from Table VII, to be noticed later, that after the crop of 1894 was harvested there had been added to Plot A *per acre, in excess of what had been taken off in crops* over 930 pounds of nitrogen, 680 of phosphoric acid and 710 of potash, all from cow manure.

The corresponding enrichment of Plot B consisted *per acre*, of over 1570 pounds of nitrogen, 2890 of phosphoric acid and 100 of potash, all from hog manure. The very large excess of phosphoric acid in the hog manure is due to the fact that the hogs were fed chiefly on hotel garbage, which contained a large quantity of bones of fowls.

The enrichment of plot C, *per acre*, amounted to over 418 pounds of nitrogen, 831 of phosphoric acid and 158 of potash all from fertilizer-chemicals.

Plot D received fertilizer-chemicals in 1888 and 1889, but in the following four years no dressing of any sort; so that after the harvest of 1894 it had acquired, *per acre*, 65 pounds more of phosphoric acid (from the applications of 1888 and 1889), than the crops had removed, but had lost 287 pounds of nitrogen and 54 pounds of potash.

Plot B also received more "organic matter" from the dressing than plot A, while plot C acquired only an insignificant amount in the dressing of fertilizer-chemicals, and plot D none at all.

Plot A receives annually about 3,207 pounds, plot B about 5,440 pounds and plot C not more than 200 pounds of organic matter.

Gross Yield of the Plots in 1894.

Table I presents the gross weight of the kernels, cobs and stover harvested on each plot. Inasmuch as the kernels were air-dried on the cob, the weight of the latter in the field-cured condition could not be taken. Hence the weight of the kernels given in the table is slightly higher and that of the cobs slightly lower than it should be. But the error is small.

Table I.—Gross Yield of the Plots in Pounds per Acre. 1894.

	Plot A. Cow manure.	Plot B. Hog manure.	Plot C. Chemicals.	Plot D. No fertilizer.
Kernels	2808.4	2904.0	2886.1	1871.0
Cobs	361.7	396.0	402.5	259.0
Stover	3609.9	3930.0	3026.4	1920.0
Total	6780.0	7230.0	6315.0	4050.0

Since these crops contain a large and variable quantity of water a strict comparison of the yields can only be made on the dry matter which the crops contain.

This appears in Table II.

TABLE II.—DRY MATTER OF THE CROPS, POUNDS PER ACRE.

1894.

	In Kernels.	In Cobs.	In Stover.	Total.
Plot A, cow manure	1770.4	323.0	1927.3	4020.7
Plot B, hog manure	1686.4	353.6	1805.4	3845.4
Plot C, fertilizer-chemicals	1761.1	359.4	1777.1	3897.6
Plot D, no fertilizer	1142.1	231.3	1317.9	2691.3

During the last five years there has been no striking difference in the crops of these four plots as far as the proportion of kernels, cobs and stover is concerned unless perhaps the crop on D which received neither fertilizers nor manure for five years, had a rather larger proportion of stover than the others. The figures are as follows:

TABLE IIa. PERCENTAGE OF WATER-FREE KERNELS, COBS AND STOVER, IN THE CROPS. AVERAGE OF FIVE YEARS.

	Plot A.	Plot B.	Plot C.	Plot D.
Kernels	45.9	46.4	45.3	43.3
Cobs	7.5	8.4	8.8	7.0
Stover	46.6	45.2	45.9	49.7
	100.00	100.00	100.0	100.0

Excess of nitrogen has not made the crop "run to leaves" nor has deficiency of plant food strikingly affected the relative proportion of ears and stalks.

The relative yields of dry matter from these plots for the last five years are given in Table III, the yield of plot A being marked in each case as 100.

TABLE III.—RELATIVE YIELD OF DRY MATTER FROM PLOTS A, B, C, D FOR FIVE YEARS.

	Plot A.	B.	C.	D.
1890	100	104.7	89.5	73.5
1891	100	92.9	82.0	65.9
1892	100	114.6	98.3	48.9
1893	100	95.1	73.2	43.1
1894	100	95.6	96.9	66.9
Average	100	100.6	88.0	59.7

It appears that during the five years the two plots A and B which were dressed with heavy applications of manure have yielded on the average the same amount of water-free crop.

Plot C, dressed with fertilizer chemicals, supplying considerably more nitrogen, phosphoric acid and potash yearly than the crop removed, yielded on the average a little less than nine tenths as much, and plot D without fertilizers six tenths as much.

The relative yield on plot D fell steadily till 1894 when it rose very considerably.

This would indicate that this plot suffered less from the prolonged drought of the last summer than those which had been dressed with manure for a term of years and which contained much more humus.

During the last five years there has been a pretty regular falling off from year to year in the yield of all four plots as is shown in Table III[a], in which the yield of dry matter for each plot in 1890 is marked as 100.

TABLE III[a].—RELATIVE YIELD OF DRY MATTER IN THE FIVE YEARS FROM 1890 TO 1894.

	Plot A.	Plot B.	Plot C.	Plot D.
1890	100	100	100	100
1891	96	81	83	81
1892	79	87	88	53
1893	58	53	48	34
1894	44	41	48	41

The falling off in yield of Plot D is no doubt in part due to lack of plant food. In the other cases this cannot be the cause. Possibly the character of the seasons or deterioration of the seed corn may explain the lessened crops on the other plots.

YIELD OF EACH FOOD INGREDIENT.

In Table IV are given the quantities, in pounds per acre, of each food ingredient harvested from the four plots in 1894.

The cobs were not analyzed, but as their amount is relatively very small, the average composition of cobs as determined in other analyses, is used for the calculation.

The yield of each food ingredient from the four plots shows, in general, differences like those already noted in respect to the yield of total dry matter.

Table V shows the composition of the crops on the four plots, A, B, C, and D, for the year 1894.

TABLE IV.—Yield of Food Ingredients in Pounds per Acre. 1894.

	Plot A.				Plot B.				Plot C.				Plot D.			
	Kernels.	Cob.	Stover.	Total.	Kernels.	Cob.	Stover.	Total.	Kernels.	Cob.	Stover.	Total.	Kernels.	Cob.	Stover.	Total.
Water	1038.0	38.7	1682.6	2759.3	1217.6	42.4	2124.6	3384.6	1125.0	43.1	1249.3	2417.4	728.9	27.7	602.1	1358.7
Ash	23.9	5.1	143.3	172.3	24.1	5.5	131.7	161.3	20.2	5.6	140.4	166.2	13.1	3.6	80.6	97.3
Albuminoids	212.6	8.7	140.8	362.1	204.5	9.5	140.3	354.3	196.0	9.7	133.5	339.2	109.3	6.2	75.7	191.2
Fiber	35.6	108.8	612.6	757.0	32.8	119.2	543.5	695.5	34.6	121.1	555.6	711.3	23.4	78.0	437.6	539.0
Nitrogen-free extract	1395.5	198.6	998.8	2592.9	1331.8	217.4	956.5	2505.7	1414.5	221.0	919.1	2554.6	936.8	142.2	702.7	1781.7
Fat	102.8	1.8	31.8	136.4	93.2	2.0	33.4	128.6	95.8	2.0	28.5	126.3	59.5	1.3	21.3	82.1
	2808.4	361.7	3609.9	6780.0	2904.0	396.0	3930.0	7230.0	2886.1	402.5	3026.4	6315.0	1871.0	259.0	1920.0	4050.0

TABLE V.—Analyses of Field-cured Maize, Kernels and Stover, from Plots A, B, C, D. 1894.

	Analyses of Field-cured Maize.						Analyses, Calculated Water-free.				
	Water.	Ash.	Albuminoids.	Fiber.	Nitrogen-Free Extract	Fat.	Ash.	Albuminoids.	Fiber.	Nitrogen-Free Extract.	Fat.
Kernels.											
Plot A	36.96	.85	7.57	1.27	49.69	3.66	1.36	12.01	2.02	78.81	5.80
Plot B	41.93	.83	7.04	1.13	45.86	3.21	1.44	12.12	1.95	78.97	5.52
Plot C	38.98	.70	6.79	1.20	49.01	3.32	1.15	11.12	1.97	80.32	5.44
Plot D	38.96	.70	5.84	1.25	50.07	3.18	1.15	9.57	2.04	82.03	5.21
Stover.											
Plot A	46.61	3.97	3.90	16.97	27.67	.88	7.44	7.31	31.78	51.82	1.65
Plot B	54.06	3.35	3.57	13.83	24.34	.85	7.29	7.77	30.10	52.98	1.86
Plot C	41.28	4.64	4.41	18.36	30.37	.94	7.91	7.51	31.26	51.71	1.61
Plot D	31.36	4.20	3.94	22.79	36.60	1.11	6.13	5.74	33.20	53.32	1.61

Table VI exhibits the striking differences in the percentage composition of the crop on the four plots calculated from the average of the five years.

The crops on A and B, which have been very heavily dressed each year, the one with cow manure the other with hog manure, have a like composition.

The crop on C, which receives each year a liberal dressing of fertilizer chemicals, 1500 pounds to the acre, contains in the kernels considerably less ash or mineral matter and albuminoids than the crops on A and B, and correspondingly more nitrogen-free extract (starch).

The kernels in the crop on D, to which no fertilizer or manure has been applied since 1889, have 1½ per cent. less albuminoids than that of plots A and B, somewhat less ash and fat, but more fiber and nitrogen-free extract.

TABLE VI.—AVERAGE COMPOSITION OF THE DRY MATTER OF KERNELS AND STOVER OF CROPS OF 1890, 1891, 1892, 1893 AND 1894.

	Ash.	Albuminoids.	Fiber.	Nitrogen-free Extract.	Fat.
KERNELS.					
Plot A	1.39	11.26	1.69	80.32	5.34
" B	1.41	11.02	1.69	80.66	5.22
" C	1.26	10.60	1.73	81.30	5.11
" D	1.24	9.53	1.85	82.46	4.92
STOVER.					
Plot A	6.80	6.40	32.80	52.51	1.49
" B	6.46	6.63	32.59	52.80	1.52
" C	6.50	6.65	32.70	52.72	1.43
" D	5.94	6.01	32.77	53.83	1.45

To complete the data regarding this experiment two other tables are given.

Table VII gives the quantities of nitrogen, phosphoric acid and potash which were added in the manure or fertilizers and remained in the crops of 1894.

It also gives the amounts of those fertilizing materials which have been added to the soil capital (+) or withdrawn (—) in the seven years during which accurate account has been kept.

Table VIII gives the record of the crops on the four plots for the whole period covered by the experiment and also the percentage composition of the several crops.

TABLE VII.—ENRICHMENT OR IMPOVERISHMENT OF SOIL BY SEVEN YEARS' MANURING AND CROPPING. POUNDS PER ACRE.

	Cow Manure. Plot A.			Hog Manure. Plot B.			Fertilizer Chemicals. Plot C.			No Fertilizer. Plot D.		
	Nitrogen.	Phos. acid.	Potash.	Nitrogen.	Phos. acid.	Potash.	Nitrogen.	Phos. acid.	Potash.	Nitrogen.	Phos. acid.	Potash.
After six years' cropping	+706.2	+561.8	+570.5	+1207.8	+2330.0	+ 68.5	+300.9	+683.3	+129.4	—256.9	+73.6	—40.0
Applied in 1894.....	286.3	136.4	204.5	419.9	586.5	72.4	172.0	162.0	69.0	00.0	00.0	00.0
Taken off in Crop of 1894	57.9	17.5	63.3	56.7	18.5	39.6	54.3	13.9	39.7	30.6	8.2	14.3
Excess (+) or Deficiency (—) after seven years' cropping	+934.6	+680.7	+711.7	+1571.0	+2898.0	+101.3	+418.6	+831.4	+158.7	—287.5	+65.4	—54.3

TABLE VIII.—YIELD OF DRY MATTER AND "SHELLED CORN" PER ACRE FOR SEVEN YEARS AND COMPOSITION OF DRY MATTER.

	Year.	Distance of Planting.	Pounds of Dry Matter per Acre.	Bushels of Shelled Corn.	Percentage Composition of Dry Matter				
					Ash.	Albuminoids.	Fiber.	Nitrogen-free Extract.	Fat.
Fertilized alike with chemicals	1888	Stalks 12 inches apart.	7350	75	3.3	7.8	19.4	66.1	3.4
	1888	" 6 " "	7980						
	1889	" 12 " "	6144	60	3.5	6.1	21.7	69.7	3.0
	1889	" 6 " "	6353						
Cow Manure	1890A	" 10 " "	9014	91	4.0	7.9	19.8	65.7	2.6
Hog Manure	1890B	" 10 " "	9436	97	4.2	8.0	19.6	65.5	2.7
Fertilizer Chemicals	1890C	" 10 " "	8070	87	3.9	8.0	21.2	64.4	2.5
No Manure or Fertilizer	1890D	" 10 " "	6626	51	3.8	6.2	20.7	66.7	2.6
Cow Manure	1891A	" 12 " "	8176	103	3.2	7.5	15.5	70.2	3.6
Hog Manure	1891B	" 12 " "	7599	88	3.3	7.6	16.2	69.3	3.6
Fertilizer Chemicals	1891C	" 12 " "	6708	70	3.2	6.4	18.5	68.8	3.1
No Manure or Fertilizer	1891D	" 12 " "	5391	60	3.1	6.0	17.4	70.2	3.3
Cow Manure	1892A	" 12 " "	7181	72	4.0	8.2	19.6	65.1	3.1
Hog Manure	1892B	" 12 " "	8233	84	4.0	8.8	19.3	64.8	3.1
Fertilizer Chemicals	1892C	" 12 " "	7062	86	3.2	8.3	17.5	67.8	3.2
No Manure or Fertilizer	1892D	" 12 " "	3509	38	3.3	7.7	18.8	67.2	3.0
Cow Manure	1893A	" 12 " "	5277	53	4.3	8.8	20.8	63.3	2.8
Hog Manure	1893B	" 12 " "	5020	52	3.8	8.4	21.1	63.9	2.8
Fertilizer Chemicals	1893C	" 12 " "	3858	37	3.8	9.0	21.6	63.0	2.6
No Manure or Fertilizer	1893D	" 12 " "	2277	18	4.6	8.2	22.5	62.4	2.3
Cow Manure	1894A	" 12 " "	4021	42	4.3	9.0	18.8	64.5	3.4
Hog Manure	1894B	" 12 " "	3845	40	4.2	9.2	18.1	65.2	3.3
Fertilizer Chemicals	1894C	" 12 " "	3898	42	4.3	8.7	18.2	65.5	3.3
No Manure or Fertilizer	1894D	" 12 " "	2691	27	3.6	7.2	20.0	66.2	3.0

EXPERIMENTS IN GROWING TOBACCO WITH DIFFERENT FERTILIZERS. SEASON OF 1893.

FINAL REPORT ON THE FERMENTED CROPS OF 1893.

By E. H. Jenkins.

The plan of these experiments and full particulars regarding the planting, cultivating, harvest, cure, and sorting of the crops of 1893 are to be found in the Seventeenth Report of this Station, 1893, pages 128 to 144.

As the crops were sorted, samples of the long and short wrappers from each plot were carefully drawn. Each sample contained twelve "hands" (15 to 20 leaves in each "hand"). Four "hands" were tied together by the butts with a tag attached bearing a number which designated the plot. No one except the Station representative knew to which plots the several numbers referred.

Early in January, 1894, these samples, each consisting of three bunches, four hands in each bunch, were cased for fermentation at the warehouse of Mr. L. B. Haas—the case being lined with top leaves and seconds from the same crop.

The case was opened and the fermented crops examined on Dec. 10th of the same year.

Shrinkage of the Tobacco during Fermentation.

The net weight of the tobacco when it was cased was 357 pounds, and after fermenting was 307 pounds. The loss was 14 per cent., nearly the same that the crop of 1892 lost (13.8 per cent.).

Quality of the Crops.

The fermented crops of 1893 were examined and graded by Mr. Benjamin L. Haas, of Hartford, one of the experts who judged of the quality of the crop of 1892.

He was not told which plots were represented by the different lots under examination, and was asked to make a strict judgment, noting all defects in the tobacco from the standpoint of a dealer in Connecticut leaf tobacco.

He devoted the greater part of two days to the work, with such assistance as could be rendered by two others not experts.

It is believed that there has thus been secured a perfectly unbiased and intelligent judgment by an expert in touch with the present requirements of the trade.

Before considering Mr. Haas' report, the conditions of the growing season of 1893 should be called to mind. It was the coldest season since 1888. It was also a very dry summer. The rainfall for the year was 4.18 inches below normal and all the summer months were much dryer than usual. On Aug. 19 and 20 there was a very light rain which wet the ground 3 inches down, and this was more rain than had fallen at any one time since the plants were set.

During the last week of August two severe gales swept over the State, which whipped and broke the tobacco somewhat.

The season was therefore a very unfavorable one for the tobacco crop, as regards both yield and quality.

The yield in 1893 was less than 85 per cent. of what it was the year before, and while the crop of 1892 had 66.7 per cent. of wrapper leaves, that of 1893 had but 48.5 per cent.

Report on the Quality of the Fermented Crop of 1893.

The crop is a very poor one. The leaves have not sweated well. The colors are extremely poor, if indeed, the crop can be said to have "color."

The one good feature of the crop is the burning quality, which is surprisingly good, better even than that of the 1892 crop.

These facts make it extremely difficult to judge the different lots of tobacco. There is no very great difference in quality observable. It is all poor.

Lot A.

Fertilizers: 1500 lbs. cotton seed meal and 1660 lbs. cotton hull ashes per acre, containing 105 lbs. nitrogen, 150 lbs. phosphoric acid and 342 lbs. potash. Cost, $60.35 per acre.

Yield: 525 lbs. long wrappers per acre.
160 " short " " "
Total 685 "

Quality:—*Burn*, fairly free, holds fire well, does not coal. *Ash*, clear gray, does not flake. *Vein*, prominent, curly, white. *Texture*, mottled, unsweated, good grain. *Size*, desirable. *Ripeness*, fairly ripe. *Colors*, bad. *Yield*, not desirable. *Taste*, fair. *Stem*, medium size. *Relative rank*, 23d.

LOT B.

Fertilizers: 1760 lbs. linseed meal, 1660 lbs. cotton hull ashes per acre, containing 105 lbs. nitrogen, 138 lbs. phosphoric acid and 340 lbs. potash. Cost, $57.79 per ton.

Yield:	585 lbs.	long wrappers per acre.
	190 "	short " " "
Total	775 "	

Quality:—*Burn*, very free, holds fire well, does not coal. *Ash*, clear white, does not flake. *Vein*, small, fine, some white. *Texture*, clear, unsweated, good grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, fairly good. *Yield*, desirable. *Taste*, fair. *Stem*, medium to small. *Relative rank*, 1st.

LOT C.

Fertilizers: 2500 lbs. cotton seed meal, 1540 lbs. cotton hull ashes per acre, containing 175 lbs. nitrogen, 172 lbs. phosphoric acid and 342 lbs. potash. Cost, $73.88 per acre.

Yield:	475 lbs.	long wrappers per acre.
	165 "	short " " "
Total	640 "	

Quality:—*Burn*, free, holds fire well, does not coal. *Ash*, clear white, does not flake. *Vein*, small, fine. *Texture*, clear, unsweated, good grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, fairly good. *Yield*, desirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 5th.

LOT D.

Fertilizers: 3000 lbs. cotton seed meal, 1500 lbs. cotton hull ashes per acre, containing 210 lbs. nitrogen, 184 lbs. phosphoric acid and 342 lbs. potash. Cost, $81.00 per acre.

Yield:	535 lbs.	long wrappers per acre.
	185 "	short " " "
Total	720 "	

Quality:—*Burn*, free, holds fire well, coals slightly. *Ash*, clear gray and does not flake. *Vein*, medium, curly. *Texture*, mottled, unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium. *Yield*, desirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 8th.

LOT E.

Fertilizers: 2260 lbs. castor pomace, 1660 lbs. cotton hull ashes per acre, containing 105 lbs. nitrogen, 139 lbs. phosphoric acid, 340 lbs. potash. Cost, $64.60 per acre.

Yield: 605 lbs. long wrappers per acre.
185 " short " " "
Total 790 "

Quality:—*Burn*, free, holds fire well, inclined to coal. *Ash*, mixed gray, but does not flake. *Vein*, prominent, curly, white. *Texture*, mottled, unsweated, close grain. *Size*, desirable. *Ripeness*, not quite ripe. *Colors*, unsweated, bad. *Yield*, undesirable. *Taste*, bitter. *Stem*, medium, woody. *Relative rank*, 29th.

LOT F.

Fertilizers: 1760 lbs. linseed meal, 660 lbs. cotton hull ashes, 260 lbs. Cooper's bone per acre, containing 105 lbs. nitrogen, 150 lbs. phosphoric acid, 150 lbs. potash. Cost, $41.79 per acre.

Yield: 725 lbs. long wrappers per acre.
185 " short " " "
Total 910 "

Quality:—*Burn*, free, holds fire well, coals slightly. *Ash*, clear gray, does not flake. *Vein*, small, fine. *Texture*, mottled, unsweated, dry, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium. *Yield*, desirable. *Taste*, fair. *Stem*, small. *Relative rank*, 3d.

LOT G.

Fertilizers: 3760 lbs. castor pomace, 1560 lbs. cotton hull ashes per acre, containing 175 lbs. nitrogen, 154 lbs. phosphoric acid and 342 lbs. potash. Cost $81.32 per acre.

Yield: 425 lbs. long wrappers per acre.
220 " short " " "
Total 645 "

Quality:—*Burn*, fairly free, holds fire fairly well, does not coal. *Ash*, clear gray, does not flake. *Vein*, medium. *Texture*, mottled, gummy, unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, undesirable. *Yield*, desirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 22d.

LOT H.

Fertilizers: 4520 lbs. castor pomace, 1520 cotton hull ashes per acre, containing 210 lbs. nitrogen, 164 lbs. phosphoric acid, 342 lbs. potash. Cost $89.94 per acre.

Yield: 690 lbs. long wrappers per acre.
210 " short " " "
Total 900 "

Quality:—*Burn*, Very free, holds fire well, does not coal. *Ash*, clear gray, does not flake. *Vein*, white. *Texture*, gummy, mottled, unsweated, good grain. *Size*, little large. *Ripeness*, ripe. *Colors*, medium. *Yield*, good. *Taste*, fair. *Stem*, large and woody. *Relative rank*, 9th.

LOT I.

Fertilizers: 2260 lbs. castor pomace, 1660 lbs. cotton hull ashes, 656 lbs. nitrate of soda (the latter in two applications after planting), per acre, containing 210 lbs. nitrogen, 139 lbs phosphoric acid, 340 lbs. potash. Cost, $81.96 per acre.

Yield: 670 lbs. long wrappers per acre.
185 " short " " "
Total 855 "

Quality:—*Burn*, fairly free, holds fire well, coals slightly. *Ash*, clear gray, does not flake. *Vein*, curly, white. *Texture*, unsweated, gummy, mottled, good grain. *Size*, desirable. *Ripeness*, not quite ripe. *Colors*, bad. *Yield*, poor. *Taste*, fair. *Stem*, medium to small. *Relative rank*, 21st.

LOT J.

Fertilizers: 2260 lbs. castor pomace, 1660 lbs. cotton hull ashes, 656 lbs. nitrate of soda per acre (the latter applied after planting), containing 210 lbs. nitrogen, 139 lbs. phosphoric acid, 340 lbs. potash. Cost $81.96 per acre.

Yield 805 lbs. long wrappers per acre.
260 " short " " "
Total 1065 "

Quality:—*Burn*, very free, holds fire well, does not coal. *Ash*, clear gray, does not flake. *Vein*, small, inclined to be white. *Texture*, fairly good but unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium, mottled. *Yield*, good. *Stem*, medium. *Relative rank*, 6th.

LOT K.

Fertilizers: 1500 lbs. cotton seed meal, 1220 lbs. double manure salt, 360 lbs. Cooper's bone per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 342 lbs. potash. Cost, $47.12 per acre.

Yield: 750 lbs. long wrappers per acre.
190 " short " " "
Total 940 "

Quality :—*Burn*, holds fire fairly well, fairly free burn, coals slightly. *Ash*, clear gray, does not flake. *Vein*, curly, white. *Texture*, dry, unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium. *Yield*, good. *Stem*, medium. *Relative rank*, 15th.

LOT L.

Fertilizers: 1500 lbs. cotton seed meal, 1220 lbs. double manure salt, 360 lbs. Cooper's bone, 300 lbs. lime per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 342 lbs. potash. Cost, $47.94 per acre.

Yield: 515 lbs. long wrappers per acre.
185 " short " " "
Total 700 "

Quality :—*Burn*, holds fire fairly well, free burn, coals very slightly. *Ash*, medium flaky, gray. *Vein*, medium. *Texture*, unsweated, mottled and gummy, good grain. *Size*, medium. *Ripeness*, ripe. *Colors*, poor. *Yield*, fair. *Taste*, fair. *Stem*, medium. *Relative rank*, 25th.

LOT M.

Fertilizers: 1500 lbs. cotton seed meal, 620 lbs. high grade sulphate of potash, 360 lbs. Cooper's bone per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 340 lbs. potash. Cost $45.87 per acre.

Yield: 455 lbs. long wrappers per acre.
195 " short " " "
Total 650 "

Quality :—*Burn*, holds fire fairly well, free burn, coals somewhat. *Ash*, mixed gray and flakes somewhat. *Vein*, prominent and curly. *Texture*, gummy and mottled, unsweated, good grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, poor. *Yield*, good. *Taste*, fair. *Stem*, medium. *Relative rank*, 28th.

Lot N.

Fertilizers: 1500 lbs. cotton seed meal, 620 lbs. high grade sulphate of potash, 360 lbs. Cooper's bone, 300 lbs. lime per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 340 lbs. potash. Cost, $46.69 per acre.

Yield: 590 lbs. long wrappers per acre.
240 " short " " "
Total 830 "

Quality:—*Burn*, holds fire well, free burn. *Ash*, blue white, does not flake. *Vein*, prominent and curly. *Texture*, gummy, mottled, unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, fair. *Yield*, good. *Taste*, fair. *Stem*, medium. *Relative rank*, 19th.

Lot O.

Fertilizers: 1500 lbs. cotton seed meal, 580 lbs. carbonate of potash, 360 lbs. Cooper's bone per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 342 lbs. potash. Cost, 78.12* per acre.

Yield: 435 lbs. long wrappers per acre.
200 " short " " "
Total 635 "

Quality:—*Burn*, holds fire fairly well, free burn, but coals somewhat. *Ash*, gray, does not flake. *Vein*, woody, white, not prominent. *Texture*, gummy, mottled, unsweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, fair. *Yield*, good. *Taste*, fair. *Stem*, medium. *Relative rank*, 24th.

Lot. P.

Fertilizers: 1500 lbs. cotton seed meal, 1740 lbs. double carbonate of potash and magnesia, 360 lbs. Cooper's bone per acre, containing 110 lbs. nitrogen, 150 lbs. phosphoric acid, 342 lbs. potash. Cost, $62.75* per acre.

Yield: 480 lbs. long wrappers per acre.
235 " short " " "
Total 715 "

Quality:—*Burn*, free, holds fire very well. *Ash*, gray, does not flake. *Vein*, fine. *Texture*, fairly good, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium to good. *Yield*, good. *Taste*, fair. *Stem*, light. *Relative rank*, 14th.

*If bought in ton lots, not chemically pure, the cost would be considerably less.

LOT Q.

Fertilizers: 2000 lbs. Baker's AA superphosphate, 4000 lbs. Baker's tobacco manure per acre, containing 233 lbs. nitrogen, 456 lbs. phosphoric acid, 533 lbs. potash.

Yield: 850 lbs. long wrappers per acre.
200 " short " " "
Total 1050 "

Quality:—*Burn*, fairly free, does not hold fire very well. *Ash*, firm, black and white. *Vein*, prominent and curly. *Texture*, harsh, undesirable. *Size*, medium to large. *Ripeness*, ripe. *Colors*, medium to good. *Yield*, undesirable. *Stem*, large. *Relative rank*, 20th.

LOT R.

Fertilizers: 2000 lbs. Stockbridge tobacco manure, 500 lbs. Stockbridge tobacco manure* per acre, containing 153 lbs. nitrogen, 245 lbs. phosphoric acid, 302 lbs. potash.

Yield: 455 lbs. long wrappers per acre.
165 " short " " "
Total 620 "

Quality:—*Burn*, free, does not coal, holds fire. *Ash*, mixed gray. *Vein*, prominent, curly. *Texture*, mottled, unsweated, good grain. *Size*, medium. *Ripeness*, ripe. *Colors*, poor. *Yield*, undesirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 17th.

LOT S.

Fertilizers: 3000 lbs. Stockbridge tobacco manure, 500 lbs. Stockbridge tobacco manure* per acre, containing 214 lbs. nitrogen, 343 lbs. phosphoric acid, 403 lbs. potash.

Yield: 615 lbs. long wrappers per acre.
215 " short " " "
Total 830 "

Quality:—*Burn*, free, does not coal, holds fire fairly well. *Ash*, mixed gray, does not flake. *Vein*, not prominent, but some white. *Texture*, fairly good, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, fair. *Yield*, desirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 7th.

* Applied as a starter.

LOT T.

Fertilizers: 880 lbs. dry fish, 440 lbs. nitrate of soda, 720 lbs. Cooper's bone, 300 lbs. lime per acre, containing 153 lbs. nitrogen, 268 lbs. phosphoric acid, no potash. Cost, $42.05 per acre.

Yield:	735 lbs.	long wrappers	per	acre.
	180 "	short "	"	"
Total	915 "			

Quality:—*Burn*, free, does not coal, holds fire fairly well. *Ash*, light gray, does not flake. *Vein*, prominent, curly. *Texture*, gummy, harsh and undesirable, good grain. *Size*, not desirable. *Ripeness*, ripe. *Colors*, mottled and dry. *Yield*, undesirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 18th.

LOT U.

Fertilizers: 600 lbs. Mapes' starter, 2200 lbs. Mapes' tobacco manure, wrapper brand per acre, containing 147 lbs. nitrogen, 206 lbs. phosphoric acid, 259 lbs. potash.

Yield:	975 lbs.	long wrappers	per	acre.
	250 "	short "	"	"
Total	1225 "			

Quality:—*Burn*, fairly free, coals slightly, holds fire fairly well. *Ash*, light gray, does not flake. *Vein*, prominent, curly. *Texture*, desirable, fine with good grain. *Size*, a little large. *Ripeness*, ripe. *Colors*, medium to good. *Yield*, desirable. *Stem*, medium. *Relative rank*, 4th.

LOT V.

Fertilizers: 800 lbs. Mapes' tobacco starter, 2000 lbs. Mapes' tobacco manure, wrapper brand per acre, containing 141 lbs. nitrogen, 220 lbs. phosphoric acid and 244 lbs. potash.

Yield:	690 lbs.	long wrappers	per	acre.
	180 "	short "	"	"
Total	870 "			

Quality:—*Burn*, fairly free, does not coal, holds fire fairly well. *Ash*, light gray, does not flake. *Vein*, not prominent, but some white. *Texture*, fairly well sweated, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, fairly good. *Yield*, good. *Taste*, fair. *Stem*, medium to heavy. *Relative rank*, 11th.

Lot W.

Fertilizers: 1000 lbs. Mapes' starter, 1800 lbs. Mapes' tobacco manure, wrapper brand per acre, containing 135 lbs. nitrogen, 232 lbs. phosphoric acid, 229 lbs. potash.

Yield: 615 lbs. long wrappers per acre.
165 " short " " "

Total 780 "

Quality:—*Burn*, fairly free, coals slightly, holds fire well. *Ash*, light gray, does not flake. *Vein*, medium. *Texture*, good, good grain. *Size*, desirable. *Ripeness*, ripe. *Colors*, fairly good, fairly well sweated. *Yield*, desirable. *Taste*, fair. *Stem*, medium. *Relative rank*, 2d.

Lot X.

Fertilizers: 2000 lbs. Sanderson's formula per acre, containing 103 lbs. nitrogen, 281 lbs. phosphoric acid, 105 lbs. potash.

Yield: 525 lbs. long wrappers per acre.
200 " short " " "

Total 725 "

Quality:—*Burn*, not free, coals very slightly, does not hold fire. *Ash*, light gray, does not flake. *Vein*, medium. *Texture*, unsweated, gummy and mottled. *Size*, not desirable. *Ripeness*, ripe. *Colors*, very bad. *Yield*, not desirable. *Stem*, small. *Relative rank*, 27th.

Lot Y.

Fertilizers: 1500 lbs. cotton seed meal, 5620 lbs. unleached wood ashes, 160 lbs. Cooper's bone per acre, containing 105 lbs. nitrogen, 153 lbs. phosphoric acid, 342 lbs. potash. Cost, $59.74 per acre.

Yield: 360 lbs. long wrappers per acre.
125 " short " " "

Total 485 "

Quality:—*Burn*, holds fire fairly well, fairly free burn, coals slightly. *Ash*, light gray, does not flake. *Vein*, small, white. *Texture*, gummy, unsweated. *Size*, desirable. *Ripeness*, ripe. *Colors*, medium. *Yield*, desirable. *Taste*, fair. *Stem*, very small. *Relative rank*, 10th.

LOT Z.

Fertilizers: 1300 lbs. dry fish, 1220 lbs. double manure salt, 200 lbs. Cooper's bone per acre, containing 105 lbs. nitrogen, 147 lbs. phosphoric acid, 342 lbs. potash. Cost, $52.12 per acre.

Yield:	315	lbs.	long wrappers	per acre.
	150	"	short "	" "
Total	465	"		

Quality:—*Burn*, holds fire fairly, fairly free burn, does not coal. *Ash*, light gray, does not flake. *Vein*, small, fine. *Texture*, unsweated, gummy. *Size*, desirable, *Ripeness*, ripe. *Colors*, poor. *Yield*, desirable. *Taste*, fair. *Stem*, small. *Relative rank*, 12th.

LOT AA.

Fertilizers: 10–12 cords stable manure, and on half the plot 500 lbs. swift-sure superphosphate as a starter per acre, containing 126 lbs. nitrogen, 143 lbs. phosphoric acid, 172 lbs. potash.

Yield:	270	lbs.	long wrappers	per acre.
	255	"	short "	" "
Total	525	"		

Quality:—*Burn*, holds fire well, free burn, but coals. *Ash*, mixed gray, does not flake. *Vein*, small and fine. *Texture*, good, unsweated, rather close grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, mottled and bad. *Yield*, good. *Taste*, fair. *Stem*, very small. *Relative rank*, 13th.

LOT BB.

Fertilizers: 6000 lbs. tobacco stems, 2640 lbs. castor pomace. On one-half the plot 500 lbs. swift-sure superphosphate as a starter per acre, containing 252 lbs. nitrogen, 146 lbs. phosphoric acid, 538 lbs. potash. Cost, $84.80 per acre.

Yield:	300	lbs.	long wrappers	per acre.
	180	"	short "	" "
Total	480	"		

Quality:—*Burn*, holds fire well, free burn, coals very slightly. *Ash*, mixed gray, does not flake. *Vein*, small, fine. *Texture*, good, unsweated, rather close grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, mottled and bad. *Yield*, good. *Taste*, fair. *Stem*, very small. *Relative rank*, 16th.

Lot CC.

Fertilizers: Pinney's Formula, containing 139 lbs. nitrogen, 210 lbs. phosphoric acid, 224 lbs. potash per acre.

Yield: 175 lbs. long wrappers per acre.
155 " short " " "
Total 330 "

Quality:—*Burn*, fairly free, does not hold fire well, coals slightly. *Ash*, mixed gray, does not flake. *Vein*, small, fine. *Texture*, good, but unsweated, rather close grain. *Size*, very desirable. *Ripeness*, ripe. *Colors*, mottled and bad. *Yield*, good. *Stem*, small. *Relative rank*, 26th.

The lots in order of their value as wrappers, taking all points into consideration, were arranged by Mr. Haas as follows:—

B, (best), W, F, U, C, J, S, D, H, Y, V, Z,
1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th,
AA, P, K, BB, R, T, N, Q, I, G, A, O,
13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th,
L, CC, X, M, E.
25th, 26th, 27th, 28th, 29th.

Discussion of the Quality of the Fermented Tobacco, Crops of 1893.

It must be borne in mind in considering these statements of the judge that there was no really good tobacco in any of the lots. They were all badly damaged by drought, and between the lots scored as best and those scored as poorest there was no great difference in quality. All the plots, however, did not suffer equally from drought. Its effects were especially severe on those plots Y, Z, AA, BB, and CC which were planted for the first time in 1893. Those which had been tilled the previous year suffered less.

Comparing the 1893 crop with that of 1892, it appears that of the seven plots which bore the best tobacco in 1892 only two are among the seven best in 1893 (C and F). Of the seven plots which bore the poorest tobacco in 1892 only two are among the seven poorest in 1893 (M and X).

It is questionable whether any fair conclusions can be drawn as to the effects of different fertilizers on the quality of the

tobacco when it seems probable that the drought rather than the fertilizers controlled the quality of the crop.

It is a striking fact that the fermented tobacco of 1893 crop from almost all the plots had a fair to very good burning quality, considerably better in fact than the 1892 crop from the experiment field, which was regarded by the judges, and especially by the manufacturers who bought and worked it into cigars as exceptionally good.

The judge's report on the burn of the two crops was as follows :

	1892 Crops.	1893 Crops.*
Burn "very free to free"	14	23
Burn "not free"	19	1
	24	24
Hold fire "very well to well"	10	13
Hold fire fairly well	8	9
"Do not hold fire"	6	2
	24	24
"Do not coal"	9	13
"Coal slightly"	11	11
"Coal"	4	0
	24	24

The defects of the experimental crop of 1893, common to the tobacco of nearly all the plots, and therefore attributed to conditions of weather are wholly in the "texture" and "colors." These defects cannot be defined at present more accurately than is done in the judge's report. Most of the tobacco is called "unsweated." But that it did ferment to some extent is certain. It lost as much weight in the case as the 1892 crop.

That the tobacco was of quite inferior quality was evident when it was sorted and before it was "sweated" or fermented. The popular saying "burn in tobacco is everything," does not hold in the present state of the trade. Desirable burn, texture and color are everything, and either two of the three are of no account without the other.

Comparative Fire-Holding Capacity.

In addition to the tests made by the expert a more extensive test was made at the Station laboratory by Messrs. Winton and

* Includes only those plots on which tobacco was grown in 1892.

Ogden, following the method described in the Station Report for 1893, p. 124.

The lot which held fire the shortest time is marked 100 and the other lots are so marked as to express numerically their comparative capacity for holding fire : for example, lot Z held fire for a shorter time than any other (100); lot AA held fire about 2¼ times as long (227).

COMPARATIVE FIRE-HOLDING CAPACITY. FERMENTED CROP OF 1893.

	Long Wrappers.	Short Wrappers.	Calculated from mean of both.	Average number of seconds during which leaf holds fire. Unfermented.	Fermented.
A	246	319	252	11	22
B	233	308	246	14	21
C	224	282	229	10	20
D	243	298	245	9	22
E	252	231	217	8	21
F	393	354	380	11	32
G	198	143	197	10	15
H	209	212	198	11	19
I	313	383	301	10	27
J	228	536	354	11	24
K	160	223	174	8	14
L	217	147	213	7	15
M	210	182	203	7	17
N	229	155	170	8	18
O	252	260	230	8	21
P	281	382	303	12	25
Q	111	166	126	6	10
R	160	172	125	7	9
S	203	169	166	8	17
T	120	121	109	7	10
U	149	230	173	8	14
V	179	225	103	9	16
W	151	185	152	8	14
X	108	115	101	7	9
Y	186	309	226	8	18
Z	114	100	100	5	10
AA	235	269	227	9	20
BB	154	178	150	8	13
CC	118	180	136	7	11

The fire-holding capacity of all the lots was increased by fermentation though not by any means equally in all cases.

The *average* fire-holding capacity before fermentation was 9 seconds, after fermentation 18 seconds.

The average of the 1892 crop was, before fermentation 9.6 seconds, after fermentation 24.4 seconds.

The better "burn" of the '93 crop as compared with that of '92 is due rather to its greater freedom from "coal" and its "free" burn when wrapped on cigars, than to its fire-holding capacity.

A more accurate method of determining fire-holding capacity is desirable. Tobaccos can only be fairly compared by this method when they are equally damp. But it is well-nigh impossible to get the crop of different seasons into the same condition of moisture in every case.

Nevertheless there is substantial agreement between the judgment of the expert on the fire-holding capacity of the different lots and the results of the laboratory tests on this point.

Thus, a study of the data regarding the two fermented crops of 1892 and 1893 shows that of the nine lots which the expert claimed did not "hold fire," eight had less than the average fire-holding capacity as determined in the laboratory. The ninth lot had just the average.

Of the twenty which the expert marked as holding fire only "fairly well," eighteen lots had less than average fire-holding capacity, as determined in the laboratory.

Of the twenty-seven lots which held fire well in the expert's opinion, only seven had less than average fire-holding capacity in laboratory tests.

Tendency to "coal" when wrapped on a cigar is not apparently associated with deficiency in fire-holding capacity. Thus, of twenty-nine lots which "coaled" more or less, fifteen had more than average fire-holding capacity.

Effect of Large Quantities of Cotton Seed Meal and Comparison of Cotton Seed Meal and Castor Pomace.

(Plots A, C, D, compared with E, G, H).

In 1893 castor pomace produced a larger yield of wrappers than equivalent quantities of cotton seed meal; on the average 778 lbs. per acre, as against 682 lbs. produced by cotton seed meal. The quality of that grown with cotton seed meal was somewhat better than the other.

The heaviest applications, 3000 lbs. of cotton seed meal and 4520 lbs. of castor pomace per acre, gave the best quality of leaf as well as the largest yield. This latter observation was also made on the crops of 1892.

Linseed Meal as a Fertilizer.

(Plot B compared with A and E; also note plot F).

The best tobacco in 1893 was raised with linseed meal. The crop which ranked third in quality, F, was also raised with linseed meal with a smaller quantity of potash. The yield of wrappers was above the average of the plots which received equivalent quantities of cotton seed meal or castor pomace, and amounted to 842 lbs. per acre.

Fish as a Fertilizer for Tobacco.

We merely call attention to the plots T and Z. T received nitrogen in form of dry fish scrap and nitrate of soda with no potash. Z received nitrogen in dry fish alone. Z was one of the plots which suffered most from the drought, and evidently no conclusions are justified from this year's crop.

Effect of Nitrate of Soda at the First and Second Cultivation.

(Plots I and J compared with H).

The point of this experiment is to ascertain the effect on the crop of supplying one-third of the nitrogen of a heavy application (210 pounds), as a top dressing in the form of nitrate of soda in one application at the time of the first cultivation (Plot I) or in two applications at the time of the first and second cultivation (Plot J). In 1892 the effect in both cases was decidedly injurious on the quality of the wrappers, though Plot J yielded 180 lbs. more of wrappers than H. In 1893 J yielded 165 lbs. more wrappers than H, and the quality of the wrappers was even better. Plot I, which received all the nitrate in one application, produced less tobacco and of inferior quality.

Effect of the Different Forms of Potash.

(Plots A, K, L, M, N, O, P, Y).

Of the plots named, the best tobacco in 1893 came from the plot which had received wood ashes, Y, which ranked 10th. That raised with the double carbonate of potash and magnesia, P, and double sulphate of potash and magnesia without lime, K, ranked 14th and 15th. But that raised with an equivalent quantity of cotton hull ashes, A, carbonate of potash, O, double

sulphate of potash and magnesia, *with lime*, L, and high grade sulphate *without* lime, M, were among the poorest lots in the field as regards quality.

As has been already stated conclusions are hardly possible where all the crops were so seriously injured by the drought.

EXPERIMENTS IN GROWING TOBACCO WITH DIFFERENT FERTILIZERS. SEASON OF 1894.

By E. H. Jenkins.

These experiments are in continuation of those begun in 1892 in cöoperation with the Connecticut Tobacco Experiment Co. of Poquonock in the town of Windsor.

Full particulars regarding the land, the conduct of the experiments and their results are given in the Report of this Station for 1892, pages 1 to 24, and Report for 1893, pages 112 to 144.

Fertilizers.

The stalks of the crop of 1893 were spread evenly on the plots and plowed in very early in the spring of 1894.

The fertilizers employed in 1894 were sampled and analyzed by Messrs. Winton and Ogden, with the following results:

Composition and Cost of Fertilizers Used.

	Cost Per Ton.	Nitrogen.	Phosphoric Acid.	Potash.
Nitrate of Soda	$50.00	16.00	----	----
Cotton Seed Meal	26.50	7.72	2.94	1.85
Castor Pomace	24.00	5.55	1.69	.90
Linseed Meal	27.00	5.75	1.77	1.28
Tobacco Stems	14.00	1.90*	.60*	8.10*
Cooper's Bone	27.00	1.60	29.20	----
Cotton Hull Ashes	45.00	----	7.04	20.1
Wood Ashes	12.00	----	1.00	3.69
High Grade Sulphate of Potash	55.00	----	----	47.44
Carbonate of Potash	170.00†	----	----	54.10
Double Carbonate Potash and Magnesia	39.00‡	----	----	18.10
Double Sulphate Potash and Magnesia	30.00	----	----	27.16
Fish	40.00	8.02	6.79	----

* Estimated. † By single pound; ton rates would be much lower.

‡ Total cost of importing a one ton lot from Stassfurt.

The chemicals used for each plot were accurately weighed and labeled by the Station representative, mixed thoroughly and bagged by Mr. DuBon and himself.

The bags were carried to the several plots by Mr. DuBon, and their contents were sowed under his constant supervision.

The following table shows the plan of the experiment, the fertilizers applied, with the cost of each as far as known, and the quantities of nitrogen, phosphoric acid and potash contained in them. See pages 272 and 273.

The fertilizers were mixed and sown on May 11th and 12th. The plants were set, with a Bemis planter, on May 22d. The field superintendent, Mr. John A. DuBon, took entire care of the land and the crop, as he has done for the past three years. The crop was harvested on August 23d and 24th.

Notes on the Rainfall, Soil Moisture and Temperature. Season of 1894.

Through the coöperation of Prof. Milton Whitney, Chief of the Division of Agricultural Soils of the U. S. Department of Agriculture, who supplied the necessary instruments, daily observations were made by Mr. Adelbert DuBon during the growing season of maximum and minimum air temperature (radiation thermometers), maximum and minimum soil temperatures (average to depth of nine inches), and rainfall.

The instruments were placed near the crop on a plot which was kept free from all vegetation.

Samples of soil to the depth of nine inches were also daily drawn by Mr. DuBon from several plots and sent to the Station for determination of moisture.

The sampling apparatus and method of packing were designed by Prof. Whitney.

These observations taken together give a record of meteorological conditions which, however incomplete, is of great assistance in comparing the conditions under which the crops of successive years are raised.

Fertilizers Applied, Season of 1894.

Name of Plot.	FERTILIZERS APPLIED. Pounds per Acre.	Cost per Acre.	Fertilizer contains pounds.		
			Nitrogen.	Phosphoric Acid.	Potash.
A	1360 Cotton Seed Meal 1560 Cotton Hull Ashes	$53.12	105	150	339
B	1826 Linseed Meal 1572 Cotton Hull Ashes	60.02	105	143	339
C	2260 Cotton Seed Meal 1480 Cotton Hull Ashes	63.24	175	170	339
D	2720 Cotton Seed Meal 1440 Cotton Hull Ashes	68.44	210	180	340
E	1900 Castor Pomace 1640 Cotton Hull Ashes	59.70	105	148	347
F	1820 Linseed Meal 640 Cotton Hull Ashes 260 Cooper's Bone	42.48	105	153	152
G	3160 Castor Pomace 1540 Cotton Hull Ashes	72.52	175	162	338
H	3780 Castor Pomace 1520 Cotton Hull Ashes	79.56	210	171	340
I	1900 Castor Pomace 1640 Cotton Hull Ashes 320 Nitrate of Soda* 320 Nitrate of Soda†	75.70	208	148	347
J	1900 Castor Pomace 1640 Cotton Hull Ashes 640 Nitrate of Soda*	75.70	208	148	347
K	1360 Cotton Seed Meal 1160 Double Sulphate of Potash and Magnesia 380 Cooper's Bone	40.55	105	149	341
L	1360 Cotton Seed Meal 1160 Double Sulphate of Potash and Magnesia 380 Cooper's Bone 300 Lime	43.55	105	149	341
M	1360 Cotton Seed Meal 660 High Grade Sulphate of Potash 380 Cooper's Bone	41.30	105	149	338
N	1360 Cotton Seed Meal 660 High Grade Sulphate of Potash 380 Cooper's Bone 300 Lime	44.30	105	149	338

* Applied between the rows at time of first cultivation.

† Applied between the rows at time of second cultivation.

FERTILIZERS APPLIED, SEASON OF 1894.

Name of Plot.	FERTILIZERS APPLIED. Pounds per Acre.	Cost per Acre.	Fertilizer contains pounds.		
			Nitrogen.	Phosphoric Acid.	Potash.
O	1360 Cotton Seed Meal 580 Carbonate of Potash 380 Cooper's Bone	$72.45	105	149	339
P	1360 Cotton Seed Meal 1740 Double Carbonate Potash and Magnesia 380 Cooper's Bone	57.08	105	149	340
Q	2000 Baker's A. A. Superphosphate 4000 Baker's Tobacco Manure	----	241	489	495
R	2000 Stockbridge Tobacco Manure 500 Stockbridge Tobacco Manure*	----	149	281	283
S	3000 Stockbridge Tobacco Manure 500 Stockbridge Tobacco Manure*	----	209	393	396
T	880 Dry Ground Fish 440 Nitrate of Soda 300 Lime	31.60	142	60	----
U	2200 Mapes' Tobacco Manure, Wrapper Brand 600 Mapes' Starter	----	158	211	278
V	2400 Mapes' Tobacco Manure, Wrapper Brand 400 Mapes' Starter	----	163	196	294
W	2400 Mapes' Tobacco Manure, Wrapper Brand	----	151	143	280
X	2000 Sanderson's Formula for Tobacco	----	103	281	105
Y	1360 Cotton Seed Meal 8540 Wood Ashes 80 Cooper's Bone	70.34	105	147	340
Z	1300 Dry Ground Fish 1260 Double Sulphate of Potash and Magnesia 200 Cooper's Bone	47.60	104	146	342
AA	Stable Manure 10–12 cords† On half the plot Swift Sure Superphosphate as a starter, at rate of 500 pounds per acre.	----	125	143	171
BB	6000 Tobacco Stems 2640 Castor Pomace On half the plot, Swift Sure Superphosphate as a starter, at rate of 500 pounds per acre	83.18	253	146	539
CC	3000 Pinney's Formula Fertilizer	----	131	196	305

* Applied as a starter.

† Estimated to contain 111 lbs. nitrogen, 71 lbs. phosphoric acid and 149 lbs. potash.

Rainfall in 1894.

The tobacco was set on May 22d and harvested on Aug. 13th and 14th, and was in the field, therefore, 83 days. The rainfall was as follows :—

May 23.....37 inch.	June 19.....04 inch.	July 16.....16 inch.
" 24.....47 "	" 20.....09 "	" 23.....12 "
" 25.....12 "	July 1.....54 "	" 29.....26 "
" 29.....62 "	" 4.....20 "	Aug. 3....2.45 "
" 31.....24 "	" 7.....10 "	" 9.....08 "
June 3.....57 "	" 14.....73 "	

Total, 7.16 inches.

June was a very dry month. The rainfall from June 3d to to July 1st was only .13 inch, and no rain at all fell from the 3d till the 19th of June.

Yet daily reports from the field marked the conditions "favorable" till June 28th, when the soil was called "too dry." The store of moisture in the soil was by that time so depleted by the hot, dry weather and the demands of the quickly growing crop that frequent showers were needed. The soil is reported "too dry" on the following days :—June 28th to 30th, July 7th, 10th to 13th, 27th to Aug. 2d; fifteen days in all.

Some crops in the same town suffered severely from drought. No marked signs of damage appeared in the experiment field, though the yield would have been larger if there had been more rain. The distribution of the rainfall is of great importance, as well as the total amount. Thus if the heavy rain of August 3d had fallen in two portions during June, it would have materially improved the crop.

The Percentage Amount of Water in the Soil.

Daily determinations of moisture in the soil, taken to the depth of 8 inches, were made on five different plots of the field, as follows :—

Plot 1 had lain unfertilized and untilled for ten years. In 1894 it was plowed and kept free from vegetation and the soil surface was occasionally stirred by raking.

Plot 2 differed from plot 1 only in having an application of linseed meal and cotton hull ashes at the rate of 1500 pounds per acre of each.

Plot 3 in like manner received dry ground fish and double sulphate of potash at the rate of 1500 pounds of each per acre.

Plots F and Y were planted with tobacco, the former dressed with 1760 lbs. to the acre of Linseed Meal, 660 of Cotton Hull Ashes and 260 lbs. of Cooper's Bone. Plot Y was dressed with

1500 lbs. Cotton Seed Meal, 5620 lbs. unleached wood ashes and 160 lbs. Cooper's bone per acre. The samples of soil on the two plots Y and F were always drawn in the row, never between the rows. For comparison are also given determinations of moisture daily made in samples of soil from the tobacco field of Mr. Addison Lamphear, of Poquonock. These samples Mr. Lamphear had the kindness to draw and mail to the Station through the season gratuitously. This field is some fifty feet lower than the experiment field, lies in a bend of the Farmington river, and is believed to be a river deposit, but its texture is not very different from that of the experiment field and the quality and color of leaf raised on it are not very different.

In the following table are given the average per cents. of water found in the soils for each week, calculated from daily determinations.

AVERAGE MOISTURE CONTENT OF SOIL BY WEEKS.

	Plots bare of Vegetation.			Plots planted to Tobacco.		
Plots	1	2	3	F	Y	A. Lamphear's.
June 10 to June 16	7.7	7.9	7.9	12.1	7.7	--
" 17 " 23	7.4	7.4	7.6	11.1	7.2	8.1
" 24 " 30	6.9	7.3	7.3	10.3	6.1	7.5
July 1 to July 7	7.3	8.0	7.6	8.9	8.3	7.5
" 8 " 14	7.5	7.7	7.5	8.4	6.2	7.0
" 15 " 21	7.7	8.0	8.1	6.6	6.0	7.5
" 22 " 28	7.7	8.0	7.9	6.6	5.4	6.5
" 29 to Aug. 4	7.5	7.7	7.9	7.5	4.3	7.3
Aug. 5 " 11	8.0	8.3	7.9	9.2	7.5	7.4
Average	7.52	7.81	7.74			

Examination of the first three columns shows that neither fertilizer had any pronounced effect in controlling the amount of water contained in the soil.

The average per cents. of moisture in the soil (to the depth named) for the growing season on plots 1, 2 and 3 were 7.5, 7.8 and 7.7 respectively.

It also appears that for some reason the soil of plot F contained considerably more moisture than either of the other plots all through the season.

Comparison of the per cent. of water in the soil of plots F and Y with the per cent. of water in the soil of the three unplanted plots shows the exhaustion of the soil water by the growing crop.

Thus until July 7, the per cents. of water in the soils of plots I and Y are not very unlike, but from there on, plot Y on which the crop was growing, held much less water than plot 1, which was bare of vegetation.

On June 19th samples of soil were carefully drawn from each plot in the field, to ascertain whether there was any striking difference in the water content of the several plots, and if so whether this could be connected with the fertilizers applied.

The diagram on the next page presents the results:—

The lowest water-content in any plot planted to tobacco was 6.5 per cent., the highest, 12.4.

The dampest soils were those of U, F, Q and T. The dryest soils were those of B, CC and X.

There is no apparent connection between the amount of moisture and the nature of the fertilizer.

There are two places in the field which are damper than the rest, one covering plots J, T, V, U, Q and F, the other covering E, A, M, N, K, H.

The first named spot was sometimes marked by a damper look of the soil after the ground was rowed out and before the crop had fairly started; the latter was never noticeable.

These spots cannot be accounted for by the "lay of the land" simply. There is no apparent reason for the difference in moisture.

Whether this difference is sufficient to affect in any way the quality of the tobacco grown on the several plots is a question which requires further study.

Temperature of Air and Soil.

Daily observations of temperature were made, as already described by Mr. Adelbert DuBon.

In a following table are given the average weekly maxima, minima and ranges of temperature.

Accidents to the minimum radiation thermometer make Mr. DuBon's record deficient.

Similar observations were made by Mr. Addison Lamphear on his own tobacco field, above described from June 17 to Aug. 18, and these are included in the table, being distinguished from those of Mr. DuBon by full-face type.

It appears that the maximum and minimum air temperatures in Mr. Lamphear's field were somewhat higher than on the experiment field. There is a very striking difference in the soil temper-

THE EXPERIMENT TOBACCO FIELD, POQUONOCK, CONN.,
SHOWING PER CENT. OF MOISTURE IN THE
SEVERAL PLOTS ON JUNE 19, 1894.

					C 7.2 B 7.3 A 7.6
			DD —	BB 8.9	AA 9.1
			CC 6.6	Z 8.2	Y 7.7
H 9.8	D 8.2	G 7.7	C 7.3	F 11.8	B 6.5
K 10.1	L 8.8	O 8.7	P 8.3	Q 10.9	X 6.9
N 9.3	M 9.2	R 8.6	S 8.9	U 12.4	V 9.0 / W 7.4
A 9.3	E 9.6	I 8.6	J 9.3	T 10.5	

ature of the two fields. The maximum soil temperatures are much lower, and the minimum soil temperatures are much higher on Mr. Lamphear's field than on the other. It follows that his soil had a much more equable temperature than the other, it transmitted heat much more slowly. To what this is due has not been determined. It seems quite possible, however, that such differences might have a very decided effect on the growth and quality of the crop.

AIR AND SOIL TEMPERATURE AT THE EXPERIMENT TOBACCO FIELD.

WEEKLY AVERAGES.

	Radiation Thermometer.			Soil Temperature.		
	Max.	Min.	Range.	Max.	Min.	Range.
June 3- 9	79.5	58.7	20.8	70.3	63.6	6.7
10-16	94.8	----	----	81.5	71.2	10.3
17-23	98.0	----	----	84.9	76.8	8.1
	98.7	**60.6**	**38.1**	**82.3**	**77.5**	**4.8**
24-30	90.7	----	----	83.9	72.3	11.6
	92.5	**63.2**	**29.3**	**77.2**	**75.2**	**2.0**
July 1- 7	92.5	58.2	34.3	89.9	68.4	21.5
	95.7	**58.4**	**37.3**	**83.3**	**75.3**	**8.0**
8-14	90.3	53.3	37.0	85.9	64.1	21.8
	95.8	**50.4**	**45.4**	**77.2**	**73.5**	**3.7**
15-21	97.0	54.4	32.6	92.1	68.8	23.3
	101.8	**59.8**	**42.0**	**83.7**	**74.9**	**8.8**
22-28	94.2	51.5	42.7	87.6	65.6	22.0
	96.0	**59.2**	**36.8**	**79.2**	**72.4**	**6.8**
29-Aug. 4	94.8	54.1	40.7	89.8	72.4	17.4
	96.4	**61.1**	**35.3**	**80.3**	**75.1**	**5.2**
Aug. 5-11	91.3	----	----	86.3	66.5	19.8
	93.4	**51.4**	**42.0**	**75.2**	**70.5**	**4.7**
12-18	86.6	----	----	83.0	62.7	20 3

The highest temperature recorded in the experiment field by the radiation thermometer was 111° Fahr., the lowest 39½°.

The highest record of the soil thermometer was 97.9, the lowest 53.1° F.

HARVESTING, CURING, STRIPPING AND SORTING.

On August 13th and 14th the crop was harvested. The method of harvest, stringing and hanging has already been described in the Report for 1893, p. 138.

The weather was favorable for curing and on Oct. 24th the crop was taken down from the poles, stripped and bundled, the crop of each plot by itself. The crops were sorted by Mr. DuBon from Nov. 17th to 22d.

As the crops were sorted, samples were carefully drawn from each lot of long and short wrappers as described in the Report for 1893, p. 138.

These samples were for laboratory examinations and for fermentation.

The following table gives the results of the sorting. The weights are in pounds. For those unfamiliar with the details of sorting leaf-tobacco, it may be said that the "seconds" are the lower leaves on the stalk, smaller than those of either of the other grades, over-ripe and unfit for wrappers. The "long wrappers" and "short wrappers" are the most valuable part of the crop, the latter being smaller and lighter, and often cutting to greater advantage than "long wrappers." The "top leaves" are often as large as the long wrappers, but heavier, darker in color and unripe.

WEIGHT OF POLE-CURED LEAVES FROM $\frac{1}{20}$ ACRE.
CROP OF 1894.

Plot.	Long Wrappers.	Short Wrappers.	Top Leaves.	Seconds.	Net Weight of Sorted Tobacco.
A	37	11½	12	21½	82
B	34½	10¼	10¾	18	73½
C	44	13	10½	12½	80
D	52½	14	12	14	92½
E	35½	12	14½	22	84
F	41	13	12	16	82
G	43	14	11½	16	84½
H	52½	14	12	15	93½
I	46	12½	16	18	92½
J	49	13	14	18	94
K	46½	11¼	14¾	17¾	90¼
L	38	13½	12	17	80½
M	34	10½	16½	23	84
N	36	11	15½	22½	85
O	39	12	13½	11	75½
P	33	11	10	16½	70½
Q	46	9½	15½	21½	92½
R	36½	11½	16½	14½	79
S	45½	12½	15	15½	88½
T	37	8	23½	23½	92
U	55½	9	14	20¼	105¾
V	43½	11¼	12¾	15¾	83¼
W	49½	13½	13½	10½	78
X	34	12	12	17	75
Y	42	10	10½	14	76½
Z	33½	12½	12½	14¾	73¼
AA	19	9	12¼	23¼	63½
BB	30	9	18	19¾	76¾
CC	31	11½	16	12½	71

PER CENT. OF THE FOUR DIFFERENT GRADES.

POLE-CURED CROP OF 1894.

Plot.	Long Wrappers.	Short Wrappers.	Total per cent. of Wrappers.	Tops.	Seconds.
A	45.1	14.0	59.1	14.7	26.2
B	46.9	13.9	60.8	14.6	24,6
C	55.0	16.2	71.2	13.1	15.7
D	56.7	15.2	71.9	12.9	15.2
E	42.3	14.3	56.6	17.3	26.1
F	50.0	15.8	65.8	14.6	19.6
G	50.9	16.5	67.4	13.6	19.0
H	56.1	14.9	71.0	12.8	16.2
I	49.7	13.5	63.2	17.3	19.5
J	52.1	13.9	66.0	14.9	19.1
K	51.5	12.5	64.0	16.3	19.7
L	47.2	16.7	63.9	14.9	21.2
M	40.4	12.5	52.9	19.6	27.5
N	42.3	12.9	55.2	18.2	26.6
O	51.7	15.9	67.6	17.9	14.5
P	46.8	15.6	62.4	14.1	23.5
Q	49.7	10.3	60.0	16.7	23.3
R	46.2	14.6	60.8	20.9	18.3
S	51.4	14.1	65.5	17.0	17.5
T	40.2	8.8	49.0	25.5	25.5
U	52.5	8.5	61.0	19.9	19.1
V	52.2	13.5	65.7	15.3	19.0
W	51.9	17.3	69.2	17.3	13.5
X	45.3	16.0	61.3	16.0	22.7
Y	54.8	13.0	67.8	13.7	18.5
Z	45.7	17.1	62.8	17.1	20.1
AA	29.9	14.1	44.0	19.3	36.7
BB	39.1	11.7	50.8	23.5	25.7
CC	43.7	16.2	59.9	22.5	17.6

COMPARATIVE FIRE-HOLDING CAPACITY.

POLE-CURED CROP OF 1894.

The method of determining the fire-holding capacity is described in the Station Report for 1892, page 17.

The lot which held fire for the shortest time is marked 100. The others are marked higher and according to their relative fire-holding capacity. Thus of the long wrappers, lot Q is marked 100 as it had a lower fire-holding capacity than any other. Lot A has about 2⅛ (218) times the fire-holding capacity of lot Q.

	Long Wrappers.	Short Wrappers.	Calculated from the Average of both.
A	218	247	218
B	207	223	201
C	224	245	220
D	201	258	217
E	223	146	167
F	134	166	142
G	204	181	177
H	245	226	218
I	130	265	192
J	283	267	255
K	215	100	139
L	132	133	123
M	154	158	146
N	196	183	175
O	241	214	210
P	314	236	251
Q	100	113	100
R	166	227	187
S	128	182	148
T	133	138	126
U	121	178	142
V	146	164	145
W	217	141	162
X	126	126	117
Y	235	349	279
Z	150	252	193
AA	151	156	143
BB	169	214	180
CC	186	202	181

Number of Pole-Cured Leaves to the Pound.

Crop of 1894.

	Long Wrappers.	Short Wrappers.		Long Wrappers.	Short Wrappers.
A	67	92	P	69	94
B	74	93	Q	67	90
C	65	87	R	53	103
D	55	86	S	65	91
E	67	94	T	60	87
F	66	91	U	59	81
G	60	80	V	62	84
H	65	83	W	73	93
I	68	88	X	64	89
J	69	88	Y	59	90
K	63	94	Z	67	88
L	62	81	AA	66	77
M	72	87	BB	59	81
N	67	97	CC	56	81
O	70	94			

Discussion of the Results.

The following paragraphs notice the principal features in the results of this year's experiments. The present plan is not to attempt any general conclusions till five successive crops have been raised, cured and fermented.

Net Weight of the Sorted Crops, 1894.

In 1892 there was harvested from 23 plots of $\frac{1}{20}$ acre each, 2122 pounds of sorted tobacco, or at the rate of 1845 pounds per acre.

In 1893 there was harvested from 28 plots 2183 pounds, or at the rate of 1559 pounds per acre.

In 1894 there was harvested from 28 plots, 2399¼ pounds of sorted tobacco, or at the rate of 1713 pounds per acre.

The crop of 1892 contained 66.7 per cent. of wrappers. The crop of 1893 contained 48.5 per cent. of wrappers, and the crop of 1894, 62.1 per cent. of wrappers.

The maximum yield in 1894 was on plot U, at the rate of 2115 lbs. of sorted tobacco per acre, of which 1290 pounds were wrappers. The maximum yield of wrappers was on plots D and H, (1860 pounds sorted tobacco, 1330 pounds wrappers.) Plots H, D, I and Q, all yielded from 1870 to 1850 pounds of sorted tobacco, with 1330, 1330, 1170 and 1110 pounds of wrappers respectively.

The smallest crops were on plots P, CC, Z and B and were respectively, 1410, 1420, 1465 and 1470 pounds of sorted tobacco. The weights of wrappers were respectively 880, 841, 920, 895 pounds.

Cotton Seed Meal and Castor Pomace. (Plots A, C, D, compared with E, G, H.)

The yield of sorted tobacco from the cotton seed meal plots averaged 1696 pounds per acre. The yield from the plots which received castor pomace in quantity equivalent to the cotton seed meal averaged 1746 pounds. The yield of wrappers grown on cotton seed meal averaged 1146 pounds, grown on castor pomace the average was 1140 pounds. The yield of the cotton seed plots and castor pomace plots are therefore practically identical.

Increasing the quantity of cotton seed meal in the fertilizer from 1360 to 2260 pounds per acre did not increase the yield, but a further increase of 500 pounds per acre made an increase of

250 pounds per acre in the sorted tobacco. The quantity of wrappers increased regularly with the increase in the quantity of cotton seed meal or castor pomace applied. These facts are shown in the following table, expressed in pounds per acre.

Cotton Seed Meal in fertilizers.	Sorted Tobacco.	Wrappers.	Castor Pomace in fertilizers.	Sorted Tobacco.	Wrappers.
1360	1640	970	1900	1680	950
2260	1600	1140	3160	1690	1140
2720	1850	1330	3780	1870	1330

Nitrate of Soda with Castor Pomace. Where for an application of 210 pounds of nitrogen, as on plot H, was substituted half that quantity of nitrogen in pomace and the other half in nitrate of soda, plots I and J, the yield was practically the same in all cases, the extreme difference of sorted tobacco being only 30 pounds per acre.

The yield of wrappers however was greatest where castor pomace alone was used, plot H, 1330 pounds, and least where half the nitrate was applied at planting and half later in the season, plot I, 1170 pounds.

Potash Salts. Of the various potash salts, the double sulphate of potash and magnesia, K, yielded the largest crop (1805 pounds) and the largest quantity of wrappers (1155 pounds). This was also true of the crops of 1892 and 1893.

When lime was used with the double sulphate L, both the total yield and the yield of wrappers was considerably smaller.

Plots L, Y, and O, to which double sulphate of potash and magnesia with lime, wood ashes, and carbonate of potash were respectively applied, yielded about 1030 pounds of wrappers each. Next rank A, cotton hull ashes, 970 pounds, N, high grade sulphate of potash with lime, 940 pounds, and M, high grade sulphate of potash and P, carbonate of potash and magnesia, which yielded each 880 pounds of wrappers.

Linseed Meal. Plot B, which received linseed meal in place of cotton seed meal, yielded 180 pounds less of crop and 75 pounds less of wrappers than A which was dressed with cotton seed meal.

But plot F which received the same quantity of linseed meal as B but less than half the quantity of cotton hull ashes yielded the same quantity of tobacco as A and 110 pounds more of wrappers.

Fish. Plot Z received its nitrogen in form of fish and is comparable with plot K on which an equivalent amount of cotton seed meal was used.

Plot Z produced 340 pounds less of tobacco than K and 235 pounds less of wrappers.

Stems and Stable Manure. Plot AA which was dressed with stable manure and BB which was dressed with tobacco stems and castor pomace produced less tobacco than most of the other plots and the least wrappers of any plots.

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VIEWS AT STORRS AGRICULTURAL COLLEGE.

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

STORRS AGRICULTURAL COLLEGE,

AT

MANSFIELD, CONN.

(P. O., Storrs, Conn.),

1894.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

HARTFORD, CONN.:
Press of The Case, Lockwood & Brainard Company.
1895.

STORRS AGRICULTURAL COLLEGE.

TRUSTEES.

His Excellency THE GOVERNOR, *ex officio, President.*

Appointed by the Board of Agriculture.

E. H. HYDE, Stafford, *Vice-President.*

	Appointed by the Senate.	Term expires.
T. S. GOLD,	West Cornwall, *Secretary,*	1897
HENRY C. MILES,	Milford, *Treasurer,*	1895
WM. E. SIMONDS,	Canton,	1897
J. M. HUBBARD,	Middletown,	1897
J. H. HALE,	South Glastonbury,	1895
E. C. PINNEY,	Stafford,	1895
Prof. S. W. JOHNSON,	New Haven, *ex officio,* Director of the Connecticut Experiment Station.	

EXECUTIVE COMMITTEE.

H. C. MILES,

T. S. GOLD, J. H. HALE.

AUDITORS.

E. C. PINNEY, J. M. HUBBARD.

FACULTY.

B. F. KOONS, *President,* Professor of Zoölogy, Geology, and Political Science.
A. B. PEEBLES, Professor of Chemistry and Physics.
C. S. PHELPS, Professor of Agriculture.
GEO. A. WATERMAN, Professor of Veterinary Science.
A. G. GULLEY, Professor of Horticulture.
Miss MARGARET KENWILL, Lady Principal.
Miss C. J. SHORT, Professor of Domestic Science.
Rev. E. J. LEWIS, Professor of English and Literature.
C. A. DAVIS, Instructor in Wood and Iron Shop.
Miss L. J. BARBER, Instructor in Mathematics and English.
L. P. CHAMBERLAIN, Farm Superintendent.

EXPERIMENT STATION STAFF.

W. O. ATWATER, Director.
C. D. WOODS, Vice-Director and Chemist.
C. S. PHELPS, Agriculturist.
S. H. BUELL, Assistant in Farm Experiments.

REPORT.

To His Excellency Hon. Luzon B. Morris, *Governor of Connecticut:*

The development of this college has gone on in the lines indicated in our report for 1893.

We have met the difficulties there indicated from the rapid growth of the college, and provided for them as far as our means have allowed.

To accommodate one hundred students with their teachers while dormitories, class-rooms, dining-room, and kitchen were planned for only fifty, has been a serious undertaking. To witness the kindly feeling, the good-natured way, in which the inconveniences of close quarters have been endured, is the only satisfaction we have had in the situation.

Details of our most pressing needs — for more ample accommodations and for means of instruction in the various departments of the college, are given by the members of the faculty in their reports. We heartily indorse these claims because be believe they are just, that the State of Connecticut in establishing the college virtually pledged its necessary means of support and development.

The Storrs School was a good foundation for a college, but this age of the world is too enlightened and too anxious for immediate results to allow an institution of so much promise to suffer for the want of material support. Hence we do not hesitate to put in our claim upon the treasury of the State for additional buildings and increased facilities of instruction.

The Storrs property is still in the market and we are all agreed that we need some portion of this for our enlarging growth.

Our farm superintendent views the detachment of one field

after another for the use of the Experiment Station and the horticulturist fields that he has laboriously toiled to clear from rocks and has brought to a high degree of productiveness, very much, we think, as the son or daughter who remains at home in charge of the old homestead views the allotment of one section of the old farm after another to the other children. So that while admitting the justice of the case, they mourn somewhat the shrinking dairy and the unfilled barns.

We wish to call particular attention again to our wants for more extended accommodations from the increased number of students, and especially to the necessity of providing for the female department. The General Assembly in 1893, in establishing the college provided for co-education. It remains for the next General Assembly to provide the necessary accommodations.

The State treasury still holds in its charge the Morrill Fund of 1862 and the amount appropriated by Congress in 1890 in an amendment to the original act. The college now receives from the State treasury $20,000 annually for the current two years. None of this national grant can be expended for land and buildings. These must be furnished from other sources.

Hon. Wm. E. Simonds, counsel for the college, in answer to inquiry, explains the present situation:

HARTFORD, CONN., December 8, 1894.

HON. T. S. GOLD, *West Cornwall, Conn.:*

DEAR SIR, — Letter of December 6, 1894, at hand. There is so much misinformation rife about the matter that it would serve a good purpose to say this:

As a practical answer to inquiries which are made from time to time, it seems advisable to make mention herein of the suit now pending in the U. S. Circuit Court for the District of Connecticut, wherein Yale College is plaintiff and the Treasurer of the State of Connecticut is defendant. Since 1863 Yale College has regularly received from the State the interest of about $135,000, which was the proceeds of the sale of public land-scrip given to the State by act of Congress, approved July 2, 1862, "donating Public Lands to the several States and Territories which may provide Colleges for the benefit of Agriculture and the Mechanic Arts."

Congress, by act approved August 30, 1890, gave to each of the several States and Territories, from the proceeds of the sale of public land, $15,-

000 for the first year thereafter, $16,000 for the second, and so on, increasing $1,000 each year till the annual appropriation amounts to $25,000, at which figure the annual appropriation is to remain stationary; it was given "for the more complete endowment and maintenance of Colleges for the benefit of agriculture and the mechanic arts now established or which may hereafter be established" under said act of 1862.

The Legislature of Connecticut, by act passed at the January Session of 1893, practically gave the congressional appropriation of 1890 to the Storrs Agricultural College and directed modifications to be made in the payments to Yale College of the interest of said $135,000.

Thereupon Yale College brought suit in the U. S. Circuit Court for the District of Connecticut, asking that the Treasurer of the State of Connecticut be enjoined from making payment under either of said funds to Storrs, and that the Treasurer be directed to make payments under both to Yale.

In that suit Yale College is represented by Hon. C. R Ingersoll and by Messrs Bristol, Stoddard & Bristol; the Treasurer is represented by E. H. Hyde, Jr., Esquire; and Storrs by Hon. W. E Simonds. The defendant filed a demurrer saying that the suit cannot be maintained because it is a suit against the State; the demurrer was duly argued; His Honor Judge Nathaniel Shipman, has rendered an opinion to the effect that he allows the injunction against paying the money to Storrs, but that the court is powerless to order the money paid to Yale; Judge Shipman is understood to clearly intimate in his opinion that the legislature has the power to give the 1890 appropriation to Storrs, but not the power to interfere with the payments of interest to Yale under the 1862 appropriation. It is understood that the defendant has filed or will file other demurrers; also that an arbitration of the whole matter is one of the possibilities of the situation.

Yours truly,
W. E. SIMONDS.

You are referred to the Report of the Treasurer for the financial condition of the college.

On behalf of the Trustees this report is

Respectfully submitted,
T. S. GOLD,
Secretary.

CALENDAR.

The College year is composed of thirty-six weeks, divided into three terms, of thirteen, twelve, and eleven respectively.

1894.

The Winter Term began January 1st, and closed March 23d. The Spring Term began April 2d, and closed with the Annual Commencement, June 15th. The Fall Term began September 17th, and closed December 18th.

1895.

The Winter Term begins January 2d, and closes March 22d. The Spring Term begins April 1st, and closes with the Annual Commencement, June 14th. The Fall Term begins September 16th, and closes December 17th.

CATALOGUE OF STUDENTS FOR THE YEAR 1894.

CLASS OF '94.

Charles Brimble,	Torrington, Litchfield Co.
Seth H. Buell,	Plymouth, Litchfield Co.
John C. Frisbie,	Southington, Hartford Co.
Harvey C. Harrison,	Northford, New Haven Co.
Hibbard M. Parker,	So. Coventry, Tolland Co.
Walter F. Schults,	Hartford, Hartford Co.
Herbert E. Warner,	East Haven, New Haven Co.
Walter A. Warren,	So. Coventry, Tolland Co.

FOURTH YEAR.

Francis A. Bartlett,	Simsbury, Hartford Co.
Hobert J. Brockett,	Montowese, New Haven Co.
Martin M. Frisbie,	Southington, Hartford Co.
Charles R. Green,	Hartford, Hartford Co.
George R. Hall,	Waterbury, New Haven Co.
William A. R. Hawley,	New Canaan, Fairfield Co.
Arthur J. Pierpont,	Waterbury, New Haven Co.
Arthur E. Shedd,	Preston City, New London Co.
William A. Stocking, Jr.,	Weatogue, Hartford Co.

THIRD YEAR.

Howard G. Barber,	Union, Tolland Co.
Neil F. Bliven,	Baltic, New London Co.
Olive N. Clark,	Saybrook, Middlesex Co.
Albert E. Coles,	Rockfall, Middlesex Co.
Clayton T. Curtis,	East Glastonbury, Hartford Co.
Daniel Dunivan,	Hartford, Hartford Co.
John H. Evans,	Thompson, Windham Co.
George L. Fish,	Mansfield, Tolland Co.
Charles S. Francis,	Newington, Hartford Co.
Ethel E. Freeman,	Spring Hill, Tolland Co.
Charles E. Gaylord,	Bristol, Hartford Co.
Stancliff Hale,	So. Glastonbury, Hartford Co.
Eugenia M. Hanks,	Spring Hill, Tolland Co.
Leunett E. Hanks,	Spring Hill, Tolland Co.
Arthur C. James,	No. Windham, Windham Co.

Robert R. James,	Danielsonville, Windham Co.
Frank E. Lathrop,	Danielsonville, Windham Co.
Robert C. Manchester,	Bristol, Hartford Co.
James B. Palmer, Jr.,	Jewett City, New London Co.
Bessie A. Parker,	So. Coventry, Tolland Co.
Harry W. Potter,	Glastonbury, Hartford Co.
Louise J Rosebrooks,	Storrs, Tolland Co.
Grace E. Snow,	Storrs, Tolland Co.
Arthur H. Sturdevant,	Bridgewater, Litchfield Co.
Edward B. Townsend,	Meriden, New Haven Co.
Leroy M. Tucker,	Middletown, Middlesex Co.
Albert B. Tyler,	Middlebury, New Haven Co.
Ernest H. Waite,	Middletown, Middlesex Co.
Mary E. Warren,	So. Coventry, Tolland Co.

SECOND YEAR.

Frank G. Atwood,	Minortown, Litchfield Co.
Harry E. Atwood,	Kensington, Hartford Co.
Harry F. Babbitt,	So. Coventry, Tolland Co.
Collette A. Baker,	Andover, Tolland Co.
Geo. M. Barlow,	Westford, Windham Co.
Benjamin S. Bassett,	No. Haven, New Haven Co.
Robert D. Beardsley,	Plymouth, Litchfield Co.
Grace E. Blakeman,	Oronoque, New Haven Co.
Philip C. Blakeslee,	No. Haven, New Haven Co.
Arthur D. Bramble,	Willington, Tolland Co.
Frederick N. Buell,	Plymouth, Litchfield Co.
Marcus H. Burr,	Redding Ridge, Fairfield Co.
Clayton E. Burr,	Higganum, Middlesex Co.
Fred. F. Bushnell,	Winsted, Litchfield Co.
Charles P. Case,	Simsbury, Hartford Co.
William J. Casey,	Meriden, New Haven Co.
Herbert T. Clark,	So. Glastonbury, Hartford Co.
Henry L. Coe,	Middlefield, Middlesex Co.
Susie A. Colburn,	Storrs, Tolland Co.
Francis Comber,	Hartford, Hartford Co.
John B. Converse,	Grosvenordale, Windham Co.
Fred. A. Cooley,	Granby, Hartford Co.
Albert G. Cote,	Baltic, New London Co.
Frank R. Cramer,	Plainville, Hartford Co.
Robert J. Dickinson,	Westville, New Haven Co.
Sherman W. Eddy,	Simsbury, Hartford Co.
Frank W. Edwards,	Weatogue, Hartford Co.
Mattie Farrell,	Storrs, Tolland Co.
John N. Fitts,	East Windsor Hill, Hartford Co.
Charles S. Foskett,	Winsted, Litchfield Co.

Erma L. Fuller,	Mansfield, Tolland Co.
Robert W. Gardner,	Spring Hill, Tolland Co.
Eugene A. Giddings,	Hartford, Hartford Co.
Albert C. Gilbert,	Gilead, Tolland Co.
Ralph D. Gilbert,	Gilead, Tolland Co.
Arthur O. Green,	Hartford, Hartford Co.
Joseph R. Gridley,	Southington, Hartford Co.
Charles N. Hart,	Southington, Hartford Co.
Clarence B. Hawley,	Hawleyville, Fairfield Co.
Charles E. Hitchcock,	Southington, Hartford Co.
Geo. A. Hunn,	Hartford, Hartford Co.
Lottie Hutchinson,	Andover, Tolland Co.
Everell James,	Danielsonville, Windham Co.
John M. Jewett,	Granby, Hartford Co.
Grove H. Johnson,	Winchester Center, Litchfield Co.
Walter H. Johnson,	New Haven, New Haven Co.
Charles E. Keeney,	No. Coventry, Tolland Co.
Olcott F. King,	So. Windsor, Hartford Co.
Ida M. Lee,	East Granby, Hartford Co.
Thomas J. Lee,	East Granby, Hartford Co.
Fred. D. Loomis,	Liberty Hill, New London Co.
S. Frederick Loomis,	Glastonbury, Hartford Co.
Victor E. Lucchini,	Meriden, New Haven Co.
Harry B. Luce,	New Britain, Hartford Co.
Irving H. Mansfield,	No. Haven New Haven Co.
Jerry Meaher,	Vinton's Mills, Hartford Co.
John H. Nye,	So Glastonbury, Hartford Co.
Herbert W. Palmer,	Montowese, New Haven Co.
Frederick B. Parker,	Gurleyville, Tolland Co
Lucian Parker,	So. Coventry, Tolland Co.
Jasper W. Porter,	Hebron, Tolland Co.
Roger F. Porter,	Hebron, Tolland Co.
William K. Raymond,	Westchester, New London Co.
Abbie Rosebrooks,	Storrs, Tolland Co
Genevieve M. Royce,	Gurleyville, Tolland Co.
Warren T. Ryan,	Thompson, Windham Co.
Fenner Sheldrick,	Hartford, Hartford Co.
William W. Stevens,	New Haven, New Haven Co.
Walter H. Stone,	Cheshire, New Haven, Co.
Benjamin S. Taylor,	Hartford, Hartford Co.
Harry O. Tucker,	New Hartford, Litchfield Co.
William C. Tyler,	Plainville, Hartford Co.
Francis von Tobel,	Harwinton, Litchfield Co.
Myron E. Waters,	Milford, New Haven Co.
Charles P. Warner,	Andover, Tolland Co.
Jesse Whitaker,	Ashford, Windham Co.
James M. Whittlesey,	Morris, Litchfield Co.
C. Edgar Wood,	Middletown, Middlesex Co.

FIRST YEAR.

Fred R. Ames,	Rockfall, Middlesex Co.
Dora A. Atwood,	Thomaston, Litchfield Co.
Elton D. Atwood,	Thomaston, Litchfield Co.
William B Atwood,	Plymouth, Litchfield Co.
Louis F. Bancroft,	Warehouse Point, Hartford Co.
Paul T. Beaumont,	So. Glastonbury, Hartford Co.
Maud M. Booth,	Tolland, Tolland Co.
Palmer Brewer,	Hillstown, Hartford Co.
Edith M. Carpenter,	Woodstock Valley, Windham Co.
Grace E. Colburn,	Storrs, Tolland Co.
Frank R. Ely,	Lebanon, New London Co.
Maud Fuller,	Mansfield, Tolland Co.
Minnie L. Fuller,	Mansfield, Tolland Co.
Arthur F. Green,	Mansfield, Tolland Co.
Charles F. Lillibridge,	Norwich, New London Co.
Edwin S. Mansfield,	No. Haven, New Haven Co.
Clifford H. Robinson,	No. Haven, New Haven Co.
Geo. L. Rosebrooks,	Storrs, Tolland Co.
William M. Stevens,	Newington, Hartford Co.
W. Irving Wheeler,	Stevenson, Fairfield Co.
Willie J. Williamson,	Stratford, New Haven Co.

Class of '94, 8; fourth year, 9; third year, 28; second year, 78; first year, 21; total, 145.

Storrs Agricultural College, Dec. 10, 1894.

To the Honorable Board of Trustees:

Gentlemen,— I have the honor to submit the following report for the year 1894.

Respectfully yours,
B. F. KOONS,
President.

Again it becomes my privilege as well as my duty to report the progress of events in the Storrs Agricultural College during the year just closing.

This year has been no exception to the rule in the growth of our work in general, and yet, in some respects, very marked differences occur when compared with the past. During a number of the former years we have felt that we had arrived at the limit of our capacity to accommodate those who applied for admission, but when our entrance examinations were completed last September, the incoming class numbered fifty-nine, and we found ourselves with twenty-eight or thirty applicants more than our accommodations would receive.

After thoroughly canvassing the field, but two solutions offered themselves: either to reject the surplus numbers, for which we had no places, or make such changes in our dormitory and dining-rooms as would temporarily allow them to *crowd* in. The latter was adopted and all the single beds with but a couple of exceptions were removed from the dormitories and packed away in the attic, and at considerable expense a simple double folding bed was devised and placed in each room so that two might be accommodated in the rooms originally intended for but one; and for additional dining-room capacity, the quarters formerly occupied as

kitchen were transformed into a dining-room, and the range and kitchen outfit transferred to the basement, and thus we are doing the best we can in crowded quarters, and under circumstances far from the ideal, hoping that the early future will bring us the needed relief.

As was reported one year ago, our dining-room and kitchen, originally intended for fifty boarders, was then accommodating seventy-five, and now we have to report that during this year, that department is struggling with the problem of boarding one hundred with the facilities to care for fifty. The same is true to-day with added emphasis, as was said in our report one year ago, that such an overcrowding of quarters and dining-rooms may be endured for a brief time, on special occasions, but to continue it for the whole school year is asking too much of those in charge of these departments, and certainly very detrimental to the success of our work.

There are two pressing needs of the institution to-day — a cottage for the young ladies, where they can enjoy the conveniences and comforts of a refined home, and a very considerable addition to the dining-room and dormitory accommodations for the young men.

Also, to keep pace with the modern systems of education, I would beg to suggest that our library, laboratories, wood and iron shop equipments need to be increased very materially. Particularly would I urge the erection of a cheap building to accommodate a dozen or more portable forges and anvils for blacksmithing. The class this year did some very creditable work, but were hampered by having a single forge, and that located in very unsuitable quarters.

What is true in this particular work is true in every department, that satisfactory results can be obtained only when good facilities for instruction are provided.

When we look over the facilities furnished to their institutions in lines similar to our own, by some of our neighboring States, we sometimes feel humiliated at the meagerness of our outfit as compared with theirs. The people of

our State are too generous and too progressive to allow their institutions to take a second place, or their young people to clamor for an education without the means of accommodating them and the best facilities for instruction being forthcoming immediately.

The growth of the institution and its work has been more rapid than its most sanguine friends dared to hope.

The year has brought various changes. In June, our Professor of Horticulture, H. E. Woodbury, resigned, and soon thereafter Prof. A. G. Gulley of the University of Vermont was secured to fill his place.

The study of English is taking a very prominent place in all leading educational institutions, and it is a matter of rejoicing with us that your interest in this very important part of the education of our pupils, has enabled us to secure the services of Rev. E. J. Lewis to take charge of the English and literary work of the two upper classes, and, feeling the need of some one to take more immediate supervision of our young ladies' department, and the home life of our pupils in general, and to look after their personal welfare, the services of Miss Margaret Kenwill were secured, and we are glad to say that thus far she has shown rare tact and ability for that very important duty.

After the work of the fall term was fairly under way, seeing that an opening could be made for some systematic class instruction in ethics — the science of morals and manners in their relation to the formation of character — and believing that Miss Kenwill was well qualified for the undertaking, one hour a week with each division of the second year class has since been devoted to that very important subject, and with very gratifying results. Believing as we do, that character building should underlie all education, for without character intellectual training is of little worth, we aim to give systematic instruction in this all-important subject to the higher classes also, and to make it a part of our curriculum in coming years.

The fact that our college year does not cover the summer

months, June 15th to Sept. 15th, the season in which very important work in horticulture and agriculture must be done, has often been the occasion for remark, and justly, too, since much could be learned practically during the summer season that cannot during other parts of the year. Hence it has often been suggested that the long vacation occur during the winter months and the school year be made to cover the whole of the summer. On the contrary, a considerable number of our young men cannot be spared from their homes during the busy summer season, as their parents do not feel financially able to be to the great expense of hiring help to take the place of the son at home, and at the same time meet the outlay of keeping him in school. To many, if not the most of them, an education must come in the winter or not at all.

To compromise and make it possible for these to get the benefits of the instruction covering the years of the college course, and hoping that by some device one summer can be given to instructive work, it was voted by the Board of Trustees to establish a summer school of horticulture, agriculture, entomology, botany, etc.

All candidates for a degree will be required to spend the summer preceding their final year in college in this summer school, beginning one week after the spring term closes, and continuing eight (8) weeks. Their work shall be ten (10) hours a week of instruction, and the students will be required to spend four (4) hours a day at garden and farm work for which they shall be allowed 10 cents an hour or less, at the discretion of the instructor, and they shall be furnished as many more hours' work as they can advantageously perform.

This Summer School of Horticulture will be open to any of the students of the other classes, also to other suitable persons not already connected with the College, who may desire to avail themselves of the advantages of the summer's instruction in one or more of the above subjects.

Board will be furnished at a cost of not to exceed $2.25 per week; tuition will be free to all the college students, and $10 to all others. The above plan will go into operation for the first time during the summer of 1895.

It will be seen by the above that those who expect to graduate and take a degree must take this summer course, and it will most likely decrease the number of graduates each year, as some will feel that they cannot give the summer preceding graduation to this work, yet by the plan it is possible for a young man to take the whole of the college course, except this summer term of eight weeks, but must forego graduation and a degree unless this is taken also.

In numerous other details our work has undergone modification, and, we trust that in each particular, the changes have been toward greater efficiency, and a wider sphere of usefulness for the institution. For the details in the several departments, I refer you to the following reports:

REPORT OF PROFESSOR PEEBLES.

To the Board of Trustees of Storrs Agricultural College:

GENTLEMEN, — During the period covered by this report I have given instruction in the following subjects: Chemistry, one term of lecture-room demonstrations, in connection with the text-book used. From this the students pass to a brief course in blow-pipe analysis, the third term continuing work in qualitative analysis.

Next in order, by members of the third year, a term's work of two hours per week in volumetric analysis, determinations of per cent. of purity of acids and alkalies, iron reductions, examination of samples of sugar and molasses for amount of adulteration. These processes require a large number of mathematical calculations, which have been found of special value. Following this two terms of agricultural chemistry, in which the two volumes of Storer's Agriculture have been used as text-books.

Members of the fourth-year class have taken up, with excellent results, the qualitative examination of fertilizers, soils, water, and such chemicals as they will most likely handle in the practical work of the farm. This is to be followed by some experiments in plant culture.

The department of physics will be much extended this year, and I am most happy to report the much enlarged facilities for work in this important subject. A room has been finished and

furnished with seats sufficient to accommodate the growing classes. The large space above the first floor of the Chemical Laboratory has been finished with ceiling, made into three rooms — one a large lecture-room, with skylight over lecture table; the other two rooms specially arranged for laboratory work in physics. With the apparatus that we are just importing for the equipment of this department, we hope and expect to make this subject of the highest practical value. The day has gone by for teaching physics exclusively from a text-book.

The usual work in mathematics has been given; one term of geometry, part of a term of trigonometry, and something more than a term of surveying. The increasing size of all classes, specially of the present third-year class, will make necessary enlarged equipment for practical work in surveying. One compass, one transit, and one level will not answer our imperative needs.

The conviction deepens upon us that we must have more time to devote to the whole subject of mathematics. Its value as a mental discipline, as well as its very practical bearing, call for at least double the time it has at present.

I have continued the instruction given in vocal music. One hour per week is required of all members of the second year. Special drill with the glee club and orchestra have followed. All of the music for commencement seasons for the past three years has been furnished by the students. The students during the past term have organized a brass band, and are succeeding admirably. In the natural order of studies, there is a brief course provided in meteorology and astronomy after that of physics. Because of a delay in receiving our physical apparatus, this has preceded the other, and the text-book used, "The Realm of Nature," has been found of absorbing interest.

This is a brief summary of the course of instruction in my department.

Very respectfully yours,

A. B. PEEBLES.

REPORT OF PROFESSOR PHELPS.

To the Trustees of the Storrs Agricultural College:

Gentlemen, — The work of the past year has progressed satisfactorily, although the readjustment of studies made necessary by the extension of the course has somewhat disturbed the regular

routine. The studies of my department as now arranged seem well adapted to a three-years course, and I have endeavored to make it suited to the conditions of Connecticut agriculture.

The fourth-year class (1894) consisted of the students who had been graduated from the school course. In order not to cover ground that had been gone over by these students, advanced work in agriculture had to be provided. During the winter term Johnson's "How Crops Feed" was used three hours per week. For the spring term a study of Experiment Station literature was taken up. This has been found of great help in acquainting the students with the recent investigations in agriculture that are proving of so much help to farmers. With the opening of the fall term the present fourth-year class began the regular schedule, consisting of three hours per week in stock-breeding, to be followed during the winter term by three hours in the principles of cattle feeding.

It has been my aim to keep the students in touch with the best agricultural thought and practice. With this end in view, the upper classes have made occasional visits to model stock farms, and have attended Dairymen's Institutes and other farmers' gatherings.

The third-year class gave two hours per week during the winter term (1894) to lectures on dairying, and for the spring term took up the study of soils from Storer's Agriculture. The present third-year class have given two hours per week to the "Care and Management of Live Stock and Breeds." Facilities for practical work in dairying have filled a long-felt want. The Station has given the College the use of its office basement, which was fitted up for a dairy-room several years ago, and the College herd has been increased by the purchase of some high-grade Jerseys. The students are given instruction in the care of the creamer and in butter-making. Two students at a time take charge of the dairy, and continue their work for two weeks. It is expected that a separator will be added during the winter term. The work in dairying can only be considered a beginning, and it is hoped that the present winter may see appropriations large enough to establish and equip a strong dairy department. Special students in dairying should also be accommodated. As dairying is the leading agricultural industry in our State, it should be made one of our strongest departments of instruction.

During the winter term (1894) the second-year class took up a study of the "Soil of the Farm," which covers briefly the formation of soils, their physical properties, drainage, tillage, and the care of manures. This has been supplemented by lectures. During the spring term a valuable work on "Crops of the Farm" was studied. This has proved one of the best text-books in agriculture we have been able to obtain. During the fall term the new class begins its work with the study of the history of agriculture by means of cyclostyled lectures. This has been thought necessary as a foundation for future studies in agriculture.

Respectfully submitted,

C. S. PHELPS,
Department of Agriculture.

REPORT OF PROF. GULLEY.

DEPARTMENT OF HORTICULTURE.

To the Trustees of the Storrs Agricultural College:

GENTLEMEN,— I hereby submit a report of the condition of this department at the present time.

My work in connection with the college did not commence until just before the opening of the present college year, hence I can only report as to the first term just ending.

At the beginning, all teaching in connection with horticulture and botany was placed in my charge. As I believe much better work can be done in horticulture when the rudiments of structural and systematic botany are understood, I arranged for a year's work of two hours each week for the second-class students, which has been carried out to the present time.

As you have adopted the plan of requiring the third class to spend a portion of its summer vacations at the college in laboratory and personal practice, the course has been remodeled with that plan in view, and the third year will be made the practical horticultural year, with instructions during the whole time, taking up the various branches of the subject, under the different heads of vegetable growing for both home and market, fruit growing, and with it nursery work or the methods of propagating hardy fruits and ornamental plants. To fit the course to the present third-year

class, eight weeks were spent with forestry, and that is now being followed by the course as laid down.

The fourth class have given the term to systematic botany, considering those families embracing plants of economic value to us in this latitude, and as well those which are detrimental, and also those from which come valuable products. The relations of our cultivated plants to each other, their source and improvement, have been considered.

The rest of the year will be devoted to floriculture and landscape gardening, insects and diseases troubling our cultivated plants, and the preventives and remedies. Then as far as the time will permit, some of the scientific problems of horticulture will be taken up.

It is intended to take the student during the two last years of the course over the branches of horticulture, and so much of botany and entomology as is closely related to them, that he may, if he continues in the work, be enabled to study the needs of the plants with which he deals and know in what directions to look for aid to make his efforts successful.

My outside work so far has been limited to gathering the crops found on the land devoted to horticulture, and to doing a little planting for spring vegetables.

As the general charge of the grounds belongs to this department, a little has been done in grading and laying out walks and in removing unsightly objects, as far as the same could be done without extra expense. There still remains a wide field for such operations, and especially in planting for ornament and protection.

The low ground between the greenhouse and the other buildings has been partially underdrained and the occasional flooding of that place which has occurred in the past will probably be prevented in the future.

The greenhouse has been re-piped and benches built, and part of it is now in use for forcing vegetables. A little has also been done to provide a stock of ornamental plants from which to propagate for use on the grounds next season. The gift of several plants from neighbors has added to the variety now on hand. The greenhouse is a very valuable addition to the department, but some changes must be made to get the best results from its use.

The college is but scantily provided with outside material for horticultural teaching. The assortment of fruit plants is small

and it will be desirable to do extensive planting next spring that we may have varieties for comparison both in growth and fruit as well as to show the proper manner to grow the plants themselves. Arrangements have already been made for stocks and seedlings with which to do a little in nursery work.

There is very little land, at present, on the college farm in the best condition for vegetable growing. But there is a very fine tract for such a purpose, when prepared, in the swamp-land east of the farm buildings. It will, however, first require thorough draining and then working for at least a year before suited for the purpose. It would be profitable to begin this work at the earliest convenient time. We need more room for our operations in this line.

I have been much assisted in all outside operations by Mr. Walter F. Schults, of the class of '94, and, since graduating, in the employ of the department. His knowledge of its affairs enabled him to offer many valuable suggestions, and he as ably helped to carry them out.

Respectfully submitted,

A. G. GULLEY,

Department of Botany and Horticulture.

REPORT OF PROF. WATERMAN.

Gentlemen, — The work of the veterinary department for the past year has been as outlined in our last report.

The fourth-year class are receiving lectures on the diseases which are liable to affect our domestic animals. Under this head we take up each disease separately, first define it, give the causes by which the diseased condition may be brought about, the symptoms or manifestations by which we recognize it, also the treatment of it, medicinal, dietetic, and hygienic. This same class also study by means of lectures the source, chemical and physical properties, and physiological actions of the various drugs used in medicine.

The free clinics on Saturdays enable the students to receive considerable practical knowledge of the subject. They are also invited to visit, with me, cases in the surrounding country when convenient for them to go. At present they are having some practical experience in the use of the tuberculin test for tuberculosis, as the

college herd is being tested by them under my supervision. I am pleased to report that thus far no case of this dreaded disease has been detected.

The third-year class has just finished the anatomy of the domestic animals. They will now take up the course the same as outlined with the fourth-year class.

The second-year class began the subject this year by first taking up anatomy. As far as possible specimens of the various parts are procured for them to study.

The aim of the department is to give practical information, adding only enough of the scientific and theoretical to make it palatable and interesting.

We do not intend to make veterinary surgeons of the students, but, rather, competent nurses; to turn out men who will be able to judge for themselves whether or no they are being imposed upon by an unqualified practitioner, the so-called "quack."

In physiology "Martin's Human Body" is taken as our guide. This is supplemented from time to time by lectures upon the parts of the body which are of the most importance. Special attention will be paid to the effects of narcotics upon the various organs of the body.

The work in military drill is gaining in interest among the students. The new students have been divided into squads of eight or ten. To each of these squads is assigned a member of the senior class, who acts as their drill-master. This not only gives the new students better chances for rapid improvement than if instructed in one large squad, but also puts them in position to respect their seniors, and also places responsibility upon the seniors, which is the only way to develop to the highest degree any nature. The members of the third-year class, along with those of the second who were here last year, are drilled by myself. A Cadet Band of some dozen pieces has been organized by the boys, one of their number acting as leader. They not only do themselves and the institution credit by the music they render, but also assist materially in making the drill more interesting and beneficial.

EQUIPMENTS.

The department of physiology needs very much a human skeleton and a manikin. From the skeleton the students could get a far better idea of the shape, position, and relation of the various

portions of the bony framework of the human body. From the manikin a better idea of the position, relations, form, and appearance of the organs of which that complex organism, the human body, is made up. The department also needs suitable rooms for veterinary dissections and clinical purposes, also a small hospital, not only that the sick animals of the college may have good and comfortable quarters, but that animals from the outside may be received and treated for a nominal sum, thus adding to the practical benefit of the course.

Respectfully submitted,

GEO. A. WATERMAN,

Veterinary Department.

REPORT OF MISS KENWILL.

To the Trustees of the Storrs Agricultural College:

GENTLEMEN, — Upon assuming charge of the home life of the students here, I was impressed immediately with the urgent need of a suitable building for the young women.

A cottage of their own, where they would have the freedom of both house and grounds, is of paramount importance in the education of both young men and young women in social refinement.

The present location of the general reception room renders it practically useless as a pleasant meeting-place for either instructors or students.

Such a room, to be easy of access, should open from the main or front hall, where it would present a hospitable welcome to strangers, and, being adjacent to the rooms of the lady of the house, be a proper meeting-place for the young men and young women.

Though the boys' dormitories are said to have improved under the present system of oversight, they are still far from satisfactory to the person in charge; and I would respectfully recommend that the services of a janitor be engaged for the general care of all the buildings, and the special care of such rooms as the inspector may designate from time to time, the salary of such janitor to be paid by the students.

The work of the sewing classes under my care will be outlined in the report of the teacher of Domestic Science, and, perhaps,

needs no comment, other than to say that the department of dressmaking will be opened in the winter term for students whose progress in plain sewing has been sufficient to fit them for such advanced work.

I would suggest that the study of ethics, now under my direction, and which has just been added to the curriculum of the second year, be carried into the third year, where greater maturity of thought will enhance the value of consideration of matters of such vital importance as the building of manhood and womanhood.

Respectfully submitted,

MARGARET KENWILL.

REPORT OF PROFESSOR LEWIS.

To the Trustees of Storrs Agricultural College:

The interest shown by the students in the work assigned and the faithfulness with which it has been done lead me to think that the Department of English Literature and Rhetoric bears evidence of substantial progress.

Fourth Year. Three hours a week are devoted to English literature. Beginning with the rise and development in Britain, we have traced the growth and expansion of our literature up to the Elizabethan era. My method has been to give, as occasion required, brief lectures indicating the historical setting of a given author and his works, thus aiming to associate in the student's mind the precise movements in politics, science, or religion in which the author finds the keynote of his message. Green's history is a source of frequent reference. Topics have been assigned and reported in contemporary literature.

This is simply supplementary to text-book study, which is strictly adhered to. Our text-book is Stopford Brooke's "English Literature" — a work remarkable for the purity and elegance of diction, as well as accurate, unbiased, and decisive in its tone of criticism of authors and books.

In connection with instruction in this department, to each student has been assigned the producing of a comprehensive essay of not less than 3,000 words on a given author, essay to be handed in on or before March 1st.

Fourth Year. The study in rhetoric with this class began with

the subject of style, and continued to paraphrase (see Waddy's "Rhetoric and Composition"). Two hours a week is given to this work.

One hour each week is given to rhetoricals. Genung's "Rhetorical Analysis" formed basis of work. Special emphasis on pronunciation, articulation, and expression. Julius Cæsar (Shakespeare) has been begun, and will be continued next term.

Third Year. Two hours a week are devoted to the third-year class — one hour in elements of composition, as arranged in Waddy's "Rhetoric and Composition," and one hour in rhetoricals, using the same text-book as that used by fourth year. Accuracy in reading has been the aim, emphasizing the salient points of expression. Every month each student is required to present an essay on a subject of his own choosing.

Personally, my duties have been a pleasure to me, and the work done by the classes is full of promise.

The number of books added to our library during the term has materially aided us in our work, and our hope is for further additions.

Yours obediently,

EDWIN J. LEWIS.

REPORT OF PROFESSOR DAVIS.

To the Board of Trustees of Storrs Agricultural College:

Gentlemen, — As shop-work naturally takes the place of the regular work on the farm, the classes are necessarily confined to the winter term, with one or two exceptions.

During the past year the Senior Class devoted three hours per week to mechanical drawing, beginning at the rudiments, and making rapid progress.

They worked in the shop four and a half hours weekly, sawing, planing, making joints, handles, and apparatus.

In the blacksmith shop each one hammered out wedges, rings, etc., finally forging and drawing the temper of a screw-driver or a cold chisel for his personal use.

In the spring each student completed a thesis drawing, 24″ x 36″, to be framed and hung up in the main building.

The subjects chosen were houses, barn construction, and machinery.

The Middle Class gave three hours to drawing. This work helped them in civil engineering, and was, in general, very satisfactory. The last drawing was an original design of a modern house by each member. Carpentry occupied four and a half hours per week. At the close of the term nine modern beehives were constructed and painted by the class.

The second-year class, being too large to handle readily, was made up into divisions. They were taught carpentry three hours, and drawing one and a half per week.

In this class the boys made a working drawing of the object at the same time they were constructing the object itself in the shop. At the end of the term they put together some bookshelves and other useful articles.

The young ladies gave two hours per week to free-hand drawing. Beginning the year by sketching blocks on small sheets of paper, they finished it with a partially filled sketch-book of flowers, leaves, trees, fences, and houses.

Commencement Day was so crowded that little or no time was to be had to examine the work, and few, if any, of the visitors knew of its existence. It is my earnest hope that it may seem fitting to allow two hours at least for the examination of the work of the sewing, cooking, laundry, drawing, forging, and carpentry classes, as well as the farm itself.

Respectfully submitted,

C. ABBOT DAVIS,

Mechanical Department.

REPORT OF MISS SHORT.

To the Trustees of the Storrs Agricultural College:

Gentlemen,— The work of the past year has been one of great interest.

As now planned, the course in Domestic Science covers four years, as follows: Beginning with the first year the fall, winter, and spring terms are given to laundry and sewing. The laundry consists of class recitations and practice — each girl doing her respective laundry for the week. Plain hand sewing is taught until the pupil is proficient in this, when plain machine sewing follows.

For the second year the fall term is devoted to sewing and laundry. During the winter term comes a course of lectures on cooking which embraces something of the chemical composition of food, the production, preparation for the table, and the use to which that particular food is put in building up the body. The subjects of marketing and table service are given their share of time. The substantials of everyday living are given the prominent place during this term. The reasons why food is prepared in certain ways are brought out, and each girl has an opportunity to cook the dishes outlined for the work of the term.

For the spring term laundry and sewing are continued. The Science of Nutrition is taken up and a term is given to the study of foods, with reference to their special effects on the human system, in both health and disease. The study of dietaries for the healthy person is based largely on the results of the experiments of Dr. Atwater. Five weeks of the term are devoted to the study of the proper foods to be given in different diseases. This includes practice in the proper methods of cooking the foods.

The work of the third year for the fall term consists of laundry, sewing, under which comes the practical application of hemming, over-casting, blind-stitching, making button-holes, patching, and darning, cooking and canning fruits, with lectures during part of the term on the preservation of fruit and vegetables and laboratory instruction in caring for the same. This is followed during the winter term by laundry work, sewing, and in cooking the young ladies are given practice in table-setting, table-waiting, and presiding at the table as hostess. For the development of this feature of the course the College is provided with a kitchen, a part of which is used as dining-room and pantry. Also a cooking range, kitchen utensils, dinner set, and tea set, table ware and individual work-tables with full equipment.

For the spring term the class continue their laundry work and plain and fancy sewing. A text-book on hygiene is used with lectures and talks on special subjects.

Begining with the fall term of the fourth year I have planned to continue the laundry, and in sewing, students may take up the study of designing, cutting, and fitting. This may continue through the entire fourth year. Household management will be taken up. This embraces the study of economy of time and strength in performing household duties, the arrangement of entertainments, the

relations of mistress to maid, the relation of the housekeeper to her environments, the sanitary location of the house, convenient arrangement of the rooms, and artistic and economical furnishing of the same. talks on the history of furniture, on rugs, and carpets, and artistic hangings, and wall paper; in all of which the laws of harmony are taught. For the winter term laundry is continued and students may furnish the material and make their own garments. Regular practice is given in the care of the machine and its mechanism is shown. Advanced cooking will be taken up of meats and pastry. The writing of menus for small families will be given its share of time.

The spring term will be devoted more to thesis work. In sewing it is hoped that each girl graduate will make her own graduating gown, and thus bring into immediate practice her previous training. In cooking each girl will write several essays during the term on various subjects assigned by the teacher. She will also write her graduating thesis on some line of Domestic Economy.

Aside from the work of my department I have the care and oversight of the boarding department. The increased number of students has necessitated a change in dining-room and kitchen, and our accommodations are heavily taxed. The girls and boys do the dining-room work and thus may in part defray their college expenses. We have a well-filled fruit room of nearly two thousand quarts of fruit and vegetables for use during the year. Our provisions are still bought at wholesale, and we find it very satisfactory — saving something on all purchases.

Respectfully submitted,

CHARLOTTE J. SHORT,

Department of Domestic Science.

REPORT OF MISS BARBER.

To the Trustees of the Storrs Agricultural College:

Gentlemen, — During the winter and spring of '94 the first-year class continued the work begun in the fall, and outlined in the last report.

The time allowed for history and physical geography — eighteen weeks each — was inadequate. This was especially so in the case

of history, for some of the students had never before studied the subject, and some had never read it.

The second-year class received one hour of instruction in English, one in penmanship, and two in algebra each week. Owing to the size of the class it was thought best to separate it into two divisions during the spring term. Of course this doubled the work of the instructor, but it was compensated by the gain to the students, especially in mathematics.

At the opening of the school year in September a slight change was made in the schedule of the first-year class.

The subject of physical geography, as we all know, consists practically of three sciences — chemistry, physics, and geology. As these subjects are taught during the college course, the study of physical geography is unnecessary, and the time formerly given to it can be used to better advantage in the study of history and English. The geography was, therefore, dropped.

Montgomery's United States history is used as a text-book, supplemented by Scudder, Fiske, and Eggleston. The "Discovery of America," "Making of New England," "Conquest of Mexico," and "History of Our Country" are also used as reference books.

The subject is taught topically as much as is possible at present. As the students become accustomed to this method the topics will be developed more fully.

The instruction in arithmetic, penmanship, and English has been similar to that given in the preceding year.

I have aimed in my language work to get three things — observation, thought, and naturalness of expression. I find that the students, as a rule, are not observing, or, if they are, they think their observations of too little importance to put on paper. The style of writing is constrained, conscious; it is evidently written for my inspection. To overcome these faults I have confined the writing almost entirely to actual experiences of the pupils, and have tried to make the students forget themselves — in fact, forget everything but the events they are describing.

The reading matter has been somewhat varied. As I wish the students to become acquainted with different authors, we have read from the works of John Burroughs, Washington Irving, Charles Dudley Warner, Nathaniel Hawthorne, Whittier, Longfellow, and Holmes. Much of the reading matter has been directly connected with the history lessons. We shall read more from the same au-

thors during the remainder of the year, and probably other authors will be added to the list. The works so far used have been obtained in paper editions, so that the expense has not been great.

The second-year class — over fifty in number — was divided at the opening of the school year. Each division has received three hours of instruction in English and penmanship each week, the English comprising reading and language. The course followed is the same as that described in the work of the first year.

The third-year class has had two hours' instruction in bookkeeping each week during the fall term. As that is all the time allowed for the subject, only the most practical and, at the same time, simple methods can be taught.

The students have had practical work in double-entry, keeping a full set of books besides writing business paper.

Respectfully submitted,

L. J. BARBER,

Instructor in Mathematics and English.

REPORT OF PROF. CHAMBERLAIN.

To the Hon. Board of Trustees:

Gentlemen, — In offering this, my eleventh annual report, I am less inclined to speak of the things which have been accomplished, important and urgent as they may seem to have been, than of those things which lie between the present and something like a full development of the resources of the college farm, for, while something has been done, much more remains to be done. To the true agriculturist there is no halting place in the line of soil-improvement, and his ambition seems never to become fully satisfied. New conditions always impose new wants, and, to him, progress becomes an endless succession of wants. How to supply these continuous demands must be his chief study, as it is his chief employment.

Climatic changes, by which a sufficient amount of rainfall has become at least uncertain during our season of growth, compel the adoption of new methods of cultivation and new systems of rotation for our high lands, and seem to demand the utilization of our neglected low lands, where nature has stored both moisture and fertility for our time of need.

The college farm includes a considerable area of such land. Its proximity to the farm buildings, the richness of its deposits of vegetable matter, the comparative ease with which it can be improved, and its present unsightliness are some of the arguments in favor of adding it to the productive farm lands.

Near by there is a much larger tract, once far more difficult to reclaim, whose annual productiveness almost excites our envy and proves the wisdom of reclaiming it even at an enormous outlay of labor and capital. Here climate loses its control of results, for, by a judicious system of drainage, the surplus moisture in times of excessive rainfall is quickly removed, and in times of scarcity it may be retained in the soil, if needed, to supply the thirsty plants. Your encouragement of this improvement leads us to hope that during the coming year some acres of this rich but water-soaked soil will be added to the productive area of the farm, and thus a valuable object-lesson be furnished to the students which will be repeated on many of our Connecticut farms.

During these years of the improvement of our meadow lands, all of which are now free from surface rocks and all other obstructions to the use of farm machinery, there has been a considerable accumulation of rocks which still occupy valuable room, and it would seem might be utilized in the construction of better farm fences. Most of these have been placed along lines where the convenient division of the farm into fields of suitable size suggested. The cost of constructing stone fences depends upon whether for utility or for beauty chiefly. Here the hammer becomes the most potent factor, and should be eliminated from the farm problem. Thus the cost of construction need not greatly exceed that of modern fences, while the superiority of such fences and the improved condition of the farm seem to favor the needed outlay.

Much of the labor, under suitable direction, might be performed by the students, many of whom might be preparing for conditions which are likely to confront them in their future experience.

The establishment of the department of horticulture, and its equipment with sufficient land for practical work, meets the most urgent need of the college. The land thus appropriated, with that previously devoted to the work of the Experiment Station, is nearly all from the permanently improved lands of the farm, and greatly lessens its area of highly productive soil, and for the present year diminishes proportionately the amount of farm pro-

ducts, as shown by the subjoined tables. This decrease appears most plainly in the items of hay, fruits, and vegetables.

Most of the cereals grown suffered severely from the drouth, while corn yielded far above the average of previous years. This is a very suggestive fact, and points directly to the necessity of adapting our system of rotation to the changing conditions of our climate. Nothing is plainer than that some plants are far less dependent upon an abundant rainfall than others. They send their roots far down to some water supply beyond the reach of most plants, and bring back the moisture which stem and leaf and flower and fruit require. These we must cherish. Nature and science are in perfect agreement. Thus it is that the fact or method which we reluctantly accept from science, nature forces upon us by our failures.

For further details of farm production during the past year I respectfully refer you to the accompanying tables.

L. P. CHAMBERLAIN,
Farm Superintendent.

COURSE OF INSTRUCTION.

The first year (see Schedule of Studies) is provided for those who have not had complete advantages in the common schools. Those who are able to pass an examination in arithmetic, English, United States history, and geography can have the choice of a short or long course,— the short covering the work of the second and third years, in which the elements of the subjects are taught, very similar to that of the School in past years, only much improved by adding horticulture, veterinary science, more training in English, etc., while the long course includes all of the short, and, at present, one year in addition, the fourth of the schedule.

The short course is to meet the wants of those who have neither the means nor the time to study longer, yet who desire the elements of an education.

The longer course is to accommodate those who have the ambition and the means to go further, and who desire to do a much higher grade of work, and thus secure a more complete education. In the near future it is planned to expand this long course into four years, and allow considerable choice of work, at least in the last year of the course, so that those who desire to make a specialty of any subject, such as horticulture, agriculture, veterinary science, domestic science, or chemistry, for example, may give their time almost exclusively to their chosen work, at least during the last year.

Those who take the short course receive a certificate at its close, the same as from the school in past years, but those who take the long course graduate with a degree. In the following schedules, the young men of the several classes take the military drill, veterinary science, agriculture, wood and iron shop work alone, and the young women the work in domestic science and physical culture. In all other studies they recite in the same classes.

SCHEDULE OF STUDIES.

First Year.

ARITHMETIC,
GRAMMAR,
U. S. HISTORY,
PENMANSHIP,
ELOCUTION,
MILITARY DRILL,
PHYSICAL CULTURE,
DOMESTIC SCIENCE.

Second Year.

AGRICULTURE,
HORTICULTURE,
VETERINARY SCIENCE,
CHEMISTRY,
BOTANY,
HUMAN PHYSIOLOGY,
DOMESTIC SCIENCE,
ALGEBRA,
ENGLISH,
SINGING,
MILITARY DRILL,
MECHANICAL DRAWING,
PENMANSHIP,
PHYSICAL CULTURE,
WOOD SHOP.

Third Year.

AGRICULTURE,
HORTICULTURE,
ENGLISH,
BOOK-KEEPING,
ORGANIC AND AGRICULTURAL CHEMISTRY,
BOTANY,
VETERINARY SCIENCE,
RHETORICALS,
DOMESTIC SCIENCE,
ETHICS,
WOOD AND IRON SHOP,
PHYSICS,
MECHANICAL AND FREE-HAND DRAWING,
SCIENCE OF GOVERNMENT,
ENTOMOLOGY,
GEOMETRY,
SURVEYING,
MILITARY DRILL,
PHYSICAL CULTURE.

Fourth Year.

HORTICULTURE,
AGRICULTURE,
VETERINARY SCIENCE,
LANDSCAPE GARDENING,
BOTANY,
ZOOLOGY,
RHETORIC,
RHETORICALS,
DOMESTIC SCIENCE,
WOOD AND IRON SHOP,
GEOLOGY,
CHEMISTRY,
METEOROLOGY,
POLITICAL ECONOMY,
ENGLISH LITERATURE,
MILITARY DRILL.

CONDITIONS OF ADMISSION.

Candidates must be fifteen years old, and each, by virtue of his entering the college, pledges himself to a faithful discharge of all duties, and a demeanor at all times such as becomes a gentleman.

LIST OF TEXT-BOOKS USED.

Johnson's How Crops Grow.
Stewart's Feeding Animals.
Miles' Stock-Breeding.
Avery's Inorganic Chemistry.
Remsen's Organic Chemistry.
Kedzie's Qualitative Chemistry.
Quantitative Chemistry.
Martin's Human Body.
Gray's Lessons and Manual of Botany.
Strong's Fruit Culture.
Shaler's Text-Book of Geology.
Scott and Morton's Soil of the Farm.
Kiddle's Ganot's Physics.
Meservey's Political Economy.
Milne's Algebra.
Wentworth's Geometry.
Wentworth's Trigonometry.
Wentworth's Surveying.
Patterson's Elements of Grammar and Composition.
Greiner's How the Garden Pays.
Selections from Standard English Authors.
Montgomery's United States History.
Everett's Ethics.
Hunt and Morrow's Soils and Crops.
Bryant and Stratton's Book-keeping.
Veasie's School Singer.
Waddy's Composition and Rhetoric.
Brooker's English Literature.

Text-books are purchased at wholesale rates, and supplied to the pupils at cost.

EXPENSES.

Tuition is $25.00 a year, $10.00 payable in advance at the beginning of each fall and winter term, and $5.00 at the beginning of the spring term, but those who are in limited circumstances and show themselves worthy, can have it remitted.

Tuition shall be paid in advance.

A deposit covering the average term bills, for board etc., ($40 to $50) shall be made in advance, or a guarantee that bills will be paid within one month after presentation, shall be furnished, signed by parent or guardian and one other acceptable person.

No guarantee will be accepted from a member of the faculty.

Text-books, table-board, washing, fuel, etc., are furnished at cost, and since these cannot be determined till the end of each term, board bills are to be paid at the close of each term as soon as the price can be determined. During this year it has averaged $2.20.

The whole expense per year, exclusive of tuition, and including board, text-books, fuel, lights, washing, etc., averages about $120 or $125, and opportunities are afforded industrious pupils to earn from $25 to $75 a year, which is credited upon their bills.

The State furnishes rooms supplied with table, chairs, bedstead, and mattress, free of rent, and the occupant is held responsible for the proper care of these, and any damage to them, or the room, or any property of the institution, must be paid for. The students must supply their own pillows, bedding, and bed linen, towels, lamps, napkins for the dining table, etc. All personal property should be distinctly and indelibly marked with the owner's name, to avoid confusion and loss in the laundry and elsewhere. A student's surroundings have much to do with his comfort, his success in his studies, and even his self-respect, hence it is urged that each supply his room with carpet, or at least rugs or mats, and whatever else will make it attractive and home-like.

Good clothing, such as is necessary for comfort at home, is all that is needed, and for farm work, any sort of substantial wearing apparel, no matter if it is patched. The students dress to suit the character of their work. A pair of rubber overshoes, a pair of rubber boots, and a rubber coat, are very desirable articles in a young man's outfit.

The military uniform is not obligatory, yet two-thirds or three-fourths of the young men secure it ; a very good suit of gray, made

to order at a cost of about $13.00 for coat, pants, and cap; perhaps as cheap as a suit of equal quality can be purchased anywhere.

LOCATION.

The railroad station is Eagleville, seven miles north of Willimantic, on the New London Northern (Central Vermont) road, and is reached from Hartford by the New York & New England, and from New Haven by the Air Line, to Willimantic, where the road intersects these lines.

COMMENCEMENT EXERCISES, JUNE 15, 1894.

PROGRAMME.

10.30 A. M.

Music — Priest's March from Athalia, *Mendelssohn.*
College Orchestra.

Prayer.

Music — The Shepherd of the Valley,
Chorus.

COLLEGE COURSE.

C. BRIMBLE, Torrington.
Veterinary Science as Related to Agriculture.

S. H. BUELL, Plymouth.
Improved Agriculture the Foundation of Social Advancement.

J. C. FRISBIE, Southington.
Bacteria in Butter-making.

Music — Spirit Immortal, "*Attila.*"
Chorus.

H. C. HARRISON, Northford.
Historical Reading.

M. H. PARKER, South Coventry.
How to Keep the Boys on the Farm.

W. F. SCHULTS, Hartford.
Our Agricultural Experiment Stations.

Music — O'er the Water, *Rowley.*
Chorus.

H. E. WARNER, East Haven.
Some Phases of the Nitrogen Problem.

W. A. WARREN, South Coventry.
Essentials to Success in Farming.

SHORT COURSE.

Excused from Reading.

H. J. BROCKETT, Montowese.
The Scientific Application of Fertilizers.

A. J. PIERPONT, Waterbury.
The Production and Sale of Milk in Connecticut.

Miss L. J. Rosebrooks, Storrs.
Science in Cooking.
Miss Annie M. Snow, Storrs.
A Plea for Farmers' Daughters.
Miss Nellie L. Wilson, Mansfield.
Floriculture.
Music — Marina Waltz, *Vandervell.*
College Orchestra.

Afternoon Exercises.
1.30 o'clock.
Music — Orchestra.
Address.
H. W. Collingwood, Managing Editor of the Rural New Yorker.
What is the Outlook for the New England Agricultural College Graduate.
Music, I. H. Mansfield.
Solo for Baritone Horn.
Awarding of Prizes.
Conferring of Diplomas.

PRIZES AND GIFTS.

By far the most important and useful gift of the year was made by the Hon. Ratcliffe Hicks of Tolland, Conn. Without any previous intimation of his intentions, Mr. Hicks informed us last May that he would contribute $50.00 to be given as prizes for *excellence in English Composition*, and to insure the permanency of this prize, to be known as the "Ratcliffe Hicks Prize" he has deposited $1,000 of 6% guaranteed interest-bearing bonds, the income of which is to be used annually for the above purpose.

The competition was thrown open to all classes last June, and in order that we might have a common basis to work from in deciding the merits of essays, all competitors wrote upon the same subject, "What a Scientific Education should do for the Practical Farmer."

The first prize was won by Miss Bessie A. Parker of South Coventry, and the second by Seth H. Buell of Plymouth.

The competition was sharp, and much hard literary work was done by the competitors, and it gave an impulse to that line of work which we believe did much substantial good; and the perpetuity of Mr. Hicks' prizes will doubtless be a constant stimulus in the future.

Beside the above, small prizes were offered in the Domestic Science department, for excellence in practical work in cooking and sewing.

Miss Edith M. Carpenter of Woodstock Valley won the first prize in sewing, and Miss Louise J. Rosebrooks of Mansfield the second. In cooking Miss Olive N. Clark of Saybrook won the first, and Miss Grace Snow of Mansfield the second.

COURSE OF LECTURES.

The usual winter course of alternate Friday night lectures was continued with the following programme:

Mrs. Gleason, . . .	"Narcotics."
A. B. Lincoln, . .	"The Underlying Principles of the Temperance Reform."
Miss Yates, . . .	"As it Was."
Prof. W. O. Atwater, .	"Food Investigations at Chicago."
Prof. L. P. Chamberlain,	"Commercial Fertilizers and their Use."
Prof. C. S. Phelps, . .	"The Work of the Experiment Station."
Prof. Geo. A. Waterman,	"Wonders of Parasite Development."
Miss C. J. Short, . .	"Kansas Agricultural College," Illustrated.
Prof. A. B. Peebles, .	"Beauties of Nature."
Mr. C. A. Davis, . .	"Electricity."
* * * *	"World's Fair," Illustrated.

PUBLIC WORSHIP.

Students are expected to attend college chapel daily, and church services Sunday morning. Parents or guardians may designate what church they desire their wards to attend, otherwise seats are provided in the church near the college.

"The true university of these days is a collection of books," says Carlyle.

Another, who has been called the Pestalozzi of America, said, "The books that charmed us in youth recall the delight ever afterwards; we are hardly persuaded there are any like them, any deserving equally our affections. Fortunate we are if the best fall in our way during this susceptible and forming period of our lives."

Perhaps it is superfluous in a New England State to quote eminent names, to emphasize the value of books, and the desirability of a good library for a modern educational institution. In such matters New England justly prides herself. I have not the facts at hand, but I believe New England has more free libraries than all the other States of the Union together.

While the free library is so desirable for every community, for

an educational institution it is an absolute necessity. Because of the stress of other matters, and the very limited means at disposal, our library has not kept pace with the general development. It would seem to be deserving of a more liberal apportionment of funds for the needs of the young ladies and gentlemen who come up to Storrs.

The collection of agricultural reports and of experiment station bulletins is fairly complete. These are of great value as books of reference. Approximately two-thirds of our library is made up of these reports. There are besides these eight hundred volumes, of which five hundred and sixty, or seventy per cent., are gifts from a few individuals, and from the granges of the State. Among the personal contributors by far the largest number are from Charles Storrs. Among other names are Dr. Noah Cressy, and Hon. Lewis Sperry.

Forty-five local granges have, during the last two years, contributed amounts varying from one dollar to forty dollars for the purchase of books. This has been expended with great care, for volumes the freshest and most practical for students of agriculture. Two valuable sets of encyclopaedias, the Britannica and American, were purchased by gifts from Saybrook Grange, and from Mountain Co. and New Haven Co. Pomona Granges.

There has been purchased by the School since its establishment about two hundred and forty volumes, and of these one-half were purchased during the present year. These cover, but not too sumptuously, the barest necessities in connection with the establishment of the departments of domestic science, veterinary science, and English literature.

The simple statement of the present condition of this most valuable adjunct of our work would seem to be sufficient. It would require an appropriation of at least a thousand dollars a year for the next five years to bring it up to the standard of the other agricultural colleges of New England. Here is a grand opportunity for some one to build and equip a memorial library, and be a blessing to his generation, and other generations after him of young students who shall come to Storrs seeking for knowledge.

That candidates for admission may be able to judge approximately what ground our entrance examination covers, we give a list of the questions used in 1894. The standard for '95 examinations will be somewhat higher.

Those who were able to pass an examination upon the following questions with a grade of 60% in each subject, were admitted to the second-year class, while those not able to pass were assigned to the first year if well enough advanced for work in this grade. (See schedule of course of studies.)

GENERAL.

1. Write your name plainly and in full, with post-office address.
2. Write the name of your parent or guardian with post-office address.
3. Give your age, where born, where you attended school last, and what your employment has been during the last year.
4. Describe the school you last attended.
5. Have you decided what your life work is to be?

ARITHMETIC.

1. $1\frac{2}{5} \times 2\frac{5}{6} + 5\frac{2}{3} - \frac{1}{2}$?
2. What will it cost to paint a floor $12\frac{1}{2}$ feet x 18 feet at $16\frac{2}{3}$ cents per square yard?
3. If lumber is selling for $40 per 1,000 feet, what must I pay for 350 feet?
4. I have 125 bushels, 1 peck, 5 quarts, 1 pint of grain and sell 24 bushels, 3 pecks, 7 quarts. How much have I left?
5. How many seconds in this month?
6. What is the compound interest of $824.75 for three years, 8 months, 15 days, at 6 per cent.?
7. How many feet, board measure, in 80 boards 18 feet long, 8 inches wide?
8. How many feet, board measure, in a stick of timber 24 feet long, 10 inches wide, and 8 inches thick?
9. How many acres in a field 40.5 rods long and 25.75 rods wide?
10. What is the square root of 1,296?

ENGLISH.

1. What are the parts of speech in the English language?
2. Write a sentence, or sentences, that will contain each. Mark them.
3. Write two sentences with verbs requiring an object.
4. Write the possessive plural of man, sheep, I, he, who, ship, city.
5. Correct the errors in the following sentences:

   He struck me.
   It is me.
   One man and one boy is sufficient.
   He writes tolerable well.

Was you there ?
Take care who you admit.
The man's manners is bad.

GEOGRAPHY.

1. Bound Connecticut, Vermont, and Pennsylvania.
2. Name the States bordering upon the Atlantic.
3. How do the climate, products, and people of Connecticut and Alabama differ ?
4. Name and locate the largest three cities in Connecticut, in the order of the size, the largest first, and the largest three rivers.
5. What and where are the following: Hudson, Erie, Delaware, Missouri, Washington, Chesapeake, Charleston, Colorado, Bangor, and Superior.

UNITED STATES HISTORY.

1. Give an outline of the settlement of Connecticut.
2. What were the causes of the War of the Revolution, and what were the results ?
3. The same of the War of the Rebellion, with dates ?
4. What States participated in the Revolutionary War, and how many are there in the Union now ?
5. Name ten of the most prominent generals of the last war.

LABOR OF STUDENTS.

For Farm,	$531.92
On farm buildings,	39.24
On farm permanent improvements,	68.04
On greenhouse,	185.12
For horticultural department,	179.46
On college grounds,	36.04
On college buildings,	253.65
Care of college buildings,	86.15
For boarding department,	281.06
In dormitories, care of,	34.80
On ice,	39.79
On fuel,	79.11
In horse barn,	61.18
In wood and iron shop,	29.38
For college,	46.35
Total,	$1,951.29
For the Experiment Station,	$46.63

ESTIMATED INVENTORY OF GOODS ON HAND.

Chemical and physical departments,	$1,650.00
Furnishing college buildings,	2,500.00
Natural history,	200.00
Mechanical department — Wood and Iron shop outfit,	278.00
Number of books and pamphlets in library, 3,500.	
Horticultural department — tools, etc.,	105.00
Domestic science department,	163.50
Kitchen and dining-room outfit,	738.70
Dormitories,	2,000.00

LIVE STOCK ON HAND DECEMBER 1, 1894.

1 pair of working-oxen,	$120.00
1 pair of farm horses,	75.00
3 grade short-horn cows,	100.00
3 grade Guernsey cows,	105.00
3 full-blood Jersey cows,	95.00
2 grade Jersey cows,	80.00
2 grade Holstein cows,	75.00
1 full-blood Jersey heifer,	30.00
7 grade heifers,	140.00
2 calves,	25.00
1 breeding sow,	15.00
2 fat hogs,	25.00
9 shoats,	54.00
Poultry,	62.00
Total,	$1,001.00
Estimated value of all farm implements,	775.00
Horse Barn:	
5 horses,	$600.00
Wagons and sleds,	350.00
Harness, blankets, etc.,	90.00
	$1,040.00
Military Department,	200.00

LABOR PERFORMED FOR COLLEGE.

By men and teams, as follows:	
Cutting and hauling ice,	$26.50
Unloading 100 tons of coal,	12.00
Hauling 20 tons of coal,	15.00
For horticultural department,	36.50
Total,	$89.00

LABOR ON PERMANENT IMPROVEMENTS.

Removing stones from farm fields,	$19.25
Building wire fences,	5.40
Building stone wall,	19.00
Grading about farm buildings,	11.00
Improvement of pasture lands,	27.00
Total,	$81.65

AMOUNT AND VALUE OF FARM PRODUCTS.

31	tons of English hay,	$496.00
6	tons of swamp hay,	48.00
8	tons of bedding hay,	48.00
1½	tons of Hungarian hay,	22.50
2	tons of oats — dried,	24.00
1¼	tons of oats straw,	12.00
1½	tons of barley straw,	12.00
2	tons of rye straw,	24.00
513	bushels of ears of corn,	153.90
493	bushels of potatoes,	319.80
215	bushels of turnips,	43.00
20	bushels of tomatoes,	10.00
12	bushels of Lima beans,	12.00
15	bushels of peas,	15.00
30	bushels of rye,	21.00
15	bushels of barley,	13.50
30	bushels of oats,	13.50
2,200	heads of celery,	80.00
3,000	pounds of squashes,	45.00
2,838	pounds of beef,	145.50
2,328	pounds of pork,	162.99
314	pounds of veal,	15.70
5,343	gallons of milk,	854.88
2	calves raised,	25.00
	swine raised,	54.00
70	tons of silage,	175.00
	Total,	$2,846.27

TREASURER'S REPORT.

H. C. Miles, *Treasurer*,
In account with Storrs Agricultural College.

1893.		Dr.	
Sept. 30.	By balance of account,		$5,009.20
Oct. 7.	By cash Comptroller,		5,000.00
9.	Sheldon & Co.,		1.55
Nov. 15.	B. F. Koons,		521.45
Dec. 2.	Experiment Station,		61.79
1894.			
Jan. 3.	Comptroller,		5,000.00
6.	Experiment Station,		6.00
8.	B. F. Koons,		1,000.00
31.	B. F. Koons,		1,000.00
April 5.	B. F. Koons,		782.66
10.	B. F. Koons,		1,000.00
	Comptroller,		5,000.00
May 3.	Experiment Station,		27.35
5.	B. F. Koons,		800.00
June 5.	B. F. Koons,		500.00
July 3.	Comptroller,		5,000.00
18.	B. F. Koons,		800.00
Aug. 13.	B. F. Koons,		500.00
Sept. 24.	B. F. Koons,		2,000.00
			$34,010.00

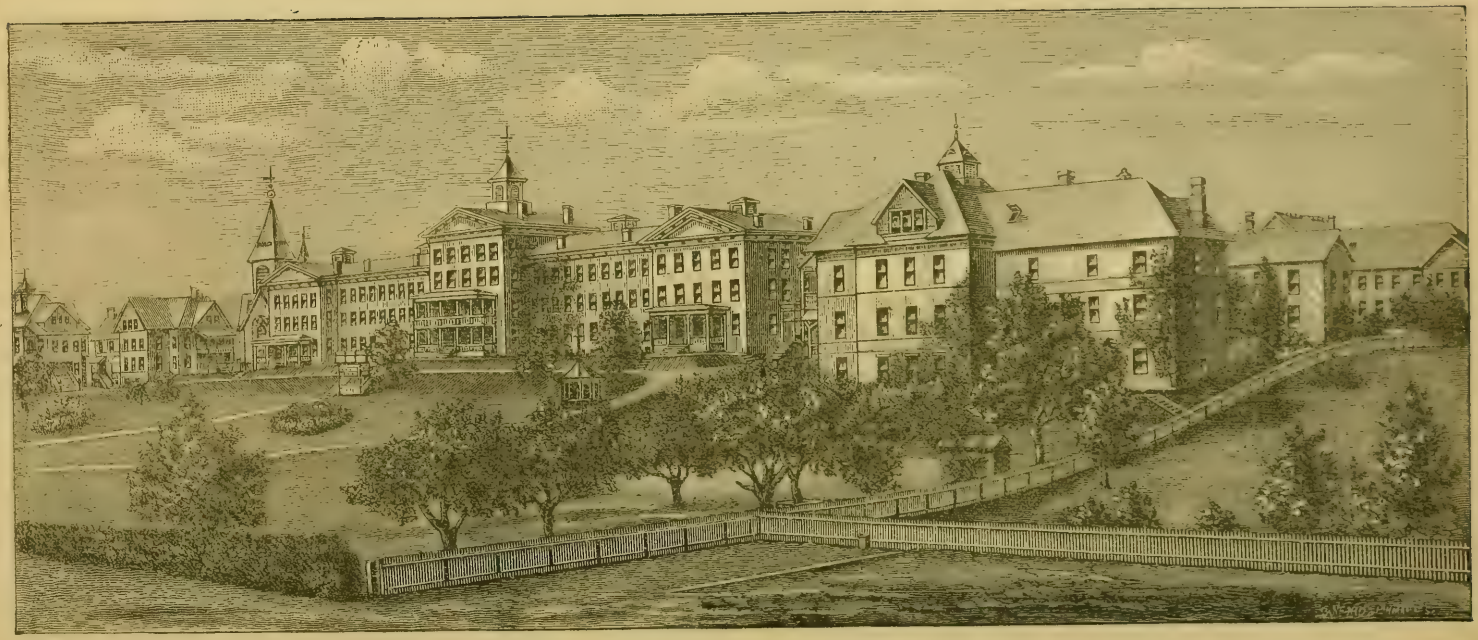
1893–4.	Cr.	
	Books and stationery,	$1,572.69
	Postage,	63.46
	Telephone,	63.80
	College supplies,	575.83
	Chemicals and apparatus,	227.28
	Buildings and repairs,	3,146.76
	College grounds,	19.98
	Shop outfit and supplies,	402.15
	Traveling expenses,	125.55
	Military Department,	230.60

Veterinary Department,	$56.78
Salaries,	11,153.32
Domestic Science Department,	180 04
Provisions,	3,218.77
Servant hire,	856.57
Fuel and lights,	1,100.18
Dormitory outfit,	1,030.12
Kitchen outfit,	708.06
Washing,	636.12
Horticultural Department,	438.01
Horticultural Department, fertilizers,	118.97
Horticultural Department, labor,	178.25
Greenhouse,	1,708.52
Horse barn supplies,	1,000 50
Farm supplies,	540.30
blacksmithing,	80.24
fertilizers,	134.33
labor,	363.16
permanent improvements,	185.71
Trustees' expenses,	336.91
Carriages,	300.00
Piano,	360.00
Interest,	22.42
Insurance,	745.00
Legal,	27.60
Sundries,	107.90
Total,	$32,015.88
Balance of account,	1,994.12
	$34,010.00

This certifies that we have examined the accounts of Henry C. Miles, Treasurer of the Storrs Agricultural College for the fiscal year ending September 30, 1894, and compared them with the vouchers, and found the same correct. The balance in the hands of the Treasurer on said date amounted to one thousand nine hundred and ninety-four dollars and twelve cents ($1,994.12).

MIDDLETOWN, January 8, 1895.

OSCAR LEACH, } *Auditors of*
E. LIVINGSTON WELLS, } *Public Accounts.*



FORTY-THIRD ANNUAL REPORT

OF THE

BOARD OF TRUSTEES,

OF THE

CONNECTICUT

School for Boys,

AT

MERIDEN, CONN.

For the Fiscal Year ending Sept. 30, 1894.

TO

His Excellency, LUZON B. MORRIS,

GOVERNOR OF THE STATE OF CONNECTICUT.

MERIDEN:
PRESS OF THE CONNECTICUT SCHOOL FOR BOYS.
1894.

TRUSTEES.

OF

THE CONNECTICUT SCHOOL FOR BOYS,

———o———

Hon. JOHN L. HOUSTON,	Thompsonville,	Hartford County.	
Trrm Expires, ...			1897.
Hon. J. N. STATES,	New Haven,	New Haven County.	
Term Expires, ...			1895.
Hon. JOHN McCARTHY,	Danbury,	Fairfield County.	
Term Expires, ...			1897.
Hon. D. A. BAKER,	Warrenville,	Windham County.	
Term Expires, ...			1895.
Hon. H. HOFFMAN,	New Preston,	Litchfield County.	
Term Expires, ...			1895.
Hon. JAS. DONOVAN,	Middletown,	Middlesex County.	
Term Expires, ...			1895.
Hon. CHAS. F. SUMNER,	Bolton,	Tolland County.	
Term Expires, ...			1895.
Hon. NATHAN D. BATES,	Preston,	New London County.	
Term Expires, ...			1895.

RESIDENT TRUSTEES.

———o———

Hon. N. L. BRADLEY,	Meriden,	New Haven County.	
Term Expires, ...			1895.
Hon. C. H. S. DAVIS,	Meriden,	New Haven County.	
Term Expires, ...			1895.
Hon. JOHN C. BYXBEE,	Meriden,	New Haven County.	
Term Expires, ...			1897.
Hon. SETH J. HALL,	Meriden,	New Haven County.	
Term Expires, ...			1897.

OFFICERS OF THE BOARD OF TRUSTEES.

———o———

PRESIDENT,

HON. JOHN L. HOUSTON.

SECRETARY AND TREASURER,

HON. C. H. S. DAVIS.

EXECUTIVE COMMITTEE,

HON. C. F. SUMNER
HON. JAS. DONOVAN
HON. JOHN C. BYXBEE,
HON. J. N. STATES,
HON. S. J. HALL.

AUDITING COMMITTEE,

HON. JAS. DONOVAN,
HON. S. J. HALL.

COMMITTEE ON DISCHARGES,

HON. N. L. BRADLEY
HON. S. J. HALL,
HON. JOHN C. BYXBEE,
SUPT. SAMUEL THATCHER,
HON. C. H. S. DAVIS,
HON. JAS. DONOVAN.

COMMITTEE ON EDUCATION,

HON. D. A. BAKER,
HON. C. H. S. DAVIS.

SANITARY COMMITTEE,

HON. C. F. SUMNER,
HON. N. L. BRADLEY.

MORAL AND RELIGIOUS TRAINING,

HON. H. HOFFMAN,
HON. JAS. DONOVAN.

INDUSTRIAL TRAINING,

HON. N. L. BRADLEY,
HON. J. N. STATES
HON. JOHN McCARTHY,
HON. D. A. BAKER.

OFFICERS OF THE SCHOOL.

———o———

SUPERINTENDENT,

REV. SAMUEL THATCHER.

MATRON,

MRS. SAMUEL THATCHER.

BOOK-KEEPER,

ROBERT S. HAYES.

TEACHERS OF CONGREGATE DEPARTMENT,

MRS. J. S. CRABB, MRS. SADIE E. GILE.
MRS. M. F. DAYTON.

SUPERVISOR OF SOUTH DIVISION,

THOMAS H. MAGUIRE.

SUPERVISOR OF NORTH DIVISION,

J. S. CRABB.

SUPERVISOR OF PRINTING DEPARTMENT,

REV. GEO. L. COBURN.

SUPERVISOR OF TELEGRAPH DEPARTMENT,

MRS. A. E. BURGESS.

HOSPITAL NURSE,

MRS. A. L. MARSTON.

FARMER,

M. H. MARSTON.

NIGHT WATCHMAN,

PATRICK WHALAN.

COTTAGE A,

SUPERVISOR—JOHN GALLAGHER.
MATRON—MRS, JOHN GALLAGHER.
TEACHER—MISS EFFIE GALLAGHER.

COTTAGE B,

SUPERVISOR—J. A. SMITH.
MATRON—MRS. J. A. SMITH.
TEACHER—NETTIE A. BROWN.

COTTAGE C,

SUPERVISOR—JOHN H. PARISH.
MATRON—MISS MARY I. RAND.
TEACHER—MRS. JOHN H. PARISH.

COTTAGE D,

SUPERVISOR—F. P. OWEN.
MATRON—MRS. F. P. OWEN.
TEACHER—MISS A. OWEN.

COTTAGE E,

SUPERVISOR—C. S. FOX.
MATRON—MRS. C. S. FOX.
TEACHER—MISS JENNIE F. WALSH.

REPORT OF THE TRUSTEES

OF THE

Connecticut School for Boys.

———o———

To His Excellency, LUZON B. MORRIS, *Governor of the State of Connecticut.*

SIR:—The Trustees of the Connecticut School for Boys respectfully present herewith their forty-third Annual Report.

We are pained to state that since our last report two deaths have taken place, which have been sadly felt by the Board of Trustees.

On November 22, 1893, Mr. Geo. E. Howe, who for sixteen years had been the efficient Superintendent of the School, died suddenly, while still faithfully performing the duties of his office. During his superintendence the school was raised to a high state of perfection, indeed it may be said that it was practically changed from a penal institution to a model school, answering all the purposes for which it was organized.

On December 5, 1893, Hon. Isaac C. Lewis of Meriden, who had served since 1877, and was one of the most willing, active, and trusted members of the Board, died at his home after a brief illness. He had always been a friend of the school, and his assistance, both financial and otherwise, was of great and material service to the Institution.

After the death of her husband, Mrs. F. M. Howe was elected temporary Superintendent, and performed the duties of that office until April 11, 1894, when she was relieved by the appointment of Rev. Samuel Thatcher of Ashford, Conn. to said office by the Trustees at their regular quarterly meeting on said date.

We are pleased to report that under the able, judicious and careful administration of Superintendent Thatcher, the affairs of the institution were never in a better or more prosperous condition. Every department is highly satisfactory, and all the officers are working together harmoniously and for the good of the School. New industries have been introduced, namely, bricklaying, carpentry, and painting, in which the boys are making satisfactory progress.

The building formerly used as a school house by the Old Road District, has been removed to the rear of the School buildings, and we expect to be able to utilize it in the near future for the purpose of teaching therein important trades to the boys.

The Superintendent's Report will show many improvements which have been made during the past year, to which report your attention is respectfully invited.

The following is a summary of the inmates from the establisment of the institutlon, in 1851, to September 30, 1894.

Whole number of boys received since 1851.	5,471
The number remaining in School, September 30, 1893,	432
The number received from September 30, 1893, to September 30, 1894,	204
The number discharged from September 30, 1893, to September 30, 1894,	211
Number returned themselves and on old commitment,	56
The whole number in the School, September 30, 1894,	481

JOHN L. HOUSTON,
SETH J. HALL,
JAMES DONOVAN,
JOHN C. BYXBEE,
JAMES N. STATES,
CHAS. H. S. DAVIS,
N. L. BRADLEY,

Sworn to before me, S. J. HALL, *State Senator.*

MERIDEN, CONN., DECEMBER 13, 1894.

SUPERINTENDENT'S REPORT.

———o———

To the Trustees of the Connecticut School for Boys:

Gentlemen:—In conformity with law I herewith submit my Annual Report for the year ending September 30, 1894.

The past year has been one of changes for the Institution. Mr. Geo. E. Howe, who for sixteen years was the trusted Superintendent of the School, on November 22 laid down life's burdens and past to his reward.

His successor, the present incumbent of the office, was appointed April 11, 1894. We also notice with regret the death of Hon. I. C. Lewis of Meriden, who had been closely connected with the life of this Institution. He having been a Trustee of the Institution for the past sixteen years, and yet, notwithstanding the workers die, the work still goes on. The work has been pursued along the same lines as in former years, and perhaps the Cottage or Open System has never been better illustrated or more satisfactory results obtained than in the last year.

There has been a growing appreciation on the part of the boys of the confidence reposed in them. There has been good progress made along all the various lines of activity. The trades already taught, such as printing and telegraphy have done good work and fill a large place in our School life. The pupils going out from these classes are getting for themselves good positions. Other trades have been started such as painting, paper-hanging and carpentering. The latter of these is a great benefit to the boys, not only in giving them a trade that they will be able to use, but is also a great power in the reformation of his character. We are also expecting to start a class in blacksmithing in the near future. There are pecularities about the trades of blacksmithing and carpentering which makes it especially helpful to the class of boys that we have to deal with. We are also hoping to introduce

military drill. This is no longer an untried experiment. It having been tried and found successful in all the reformatories in the country. We do this not only for the discipline, but forthe physical benefit of the pupils.

The repairs in and about the Institution has been done by the trade classes and to day all the buildings are in first class condition, with the exception of the cow barn which we are hoping to rebuild in the near future.

The sanitary condition of the School is very good there having been no deaths during the past year, and a very little sickness. The property known as the Railroad School buildings, purchased by the appropriation of the last Legislature has been taken possession of.

The large building has been moved west of the main building and fitted up as work shops. This has extended our front on Colony Street. The lawn has been graded and an ornamental, wrought iron fence has been erected, also an eight foot flag sidewalk has been laid.

This gives us a frontage of which the citizens of Meriden and the State do well to be proud of. For further information we refer you to the tabulated statistic.

All of which is respectfully submitted,

SAMUEL THATCHER, *Supt.*

PHYSICIAN'S REPORT.

To the Superintendent of the Connecticut School for Boys.

During my term of service, from May to December, 1894, the health of the Institution has been very good, there having been no epidemic, or death in the school. Many of the boys have come to the school poorly nourished, and handicapped with an heriditary tendency to scrofula, consumption, etc., but plenty of good food and regular habits create a great change in their appearance after a few months.

The present hospital accommodations answer every purpose at present, but should an epidemic break out we would be badly cramped for room.

Owing to the possibility of boys coming from districts infected with scarlet fever, diphtheria, measles, and other infectious diseases, I would suggest that every boy, upon entrance, be submitted to a rigid examination.

From May to December, 1894, the following cases have been under treatment in the hospital.

Abcess,	5	Fever, remittent,	5	Phthisis	2
Bronchitis, acute,	7	Glands, enlarged,	2	Rheumatism, acute,	1
Cephalagia,	2	Glands, scrofulous,	2	Rheumatism, chronic,	1
Conjunctivitis,	6	Gleet,	5	Rheumatism, syphilitic,	1
Contusions,	4	Gonorrhœa,	10	Scabies,	1
Diarrhœa,	8	Hordeolum,	1	Sprain,	2
Dysentery,	4	Indigestion,	2	Synovitis,	1
Eczema, simple,	1	Incised wound,	2	Syphilis, hereditary,	1
Epilepsy,	1	Malaria,	4	Tinea capitis,	1
Fistula in Ano,	1	Myalgia,	2	Tonsillitis,	2
Fracture, forearm,	1	Necrosis,	1		
Fever, bilious,	1	Otorrhœa,	1		
Fever, enteric,	1	Pharyngitis,	2		
Fever, intermit'nt,	4				

CHAS. H. S. DAVIS, *M. D.*

EXHIBIT NO. 1.

CLASSIFIED STATEMENT OF EXPENDITURES AND RECEIPTS OF THE CONNECTICUT SCHOOL FOR BOYS, FROM OCT. 1, 1893, TO SEPT. 30, 1894.

EXPENDITURES.		RECEIPTS.	
Chair Shop,	$170.69	Bal. Oct. 1st, 1893,	$2,810.77
Printing Office,	1,291.55	Fr. Chair Shop,	4,379.93
Miscellaneous,	663.43	State Treasurer,	70,514.17
Farm,	1,233.59	Printing Office,	361.37
Traveling,	584.70	Boarders,	292.15
Library & Sch'l B'ks,	912.01	Miscellaneous,	111.00
Postage,	92.00	Farm,	405.81
Freight,	319.46	Freight,	38.51
Tel'ph & Telephone,	112.86	Tel'ph & Tel'one,	.25
Chapel,	113.50	Provisions,	1.05
Provisions,	19,247.41	Repairs,	10.00
House Furnishing,	2,265.79	Stable,	55.30
Repairs & Improv'ts,	7,930.91	Shoe Shop,	16.75
Laundry,	647.61	Insurance,	398.42
Clothing,	5,698.83		
Heating and Lights,	8,128.75		
Hospital,	601.87		
Stable,	1,817.30		
Salaries,	21,941.27		
Shoe Shop,	1,285.59		
Returning Escapes,	97.73		
Stationery,	141.66		
Water Works,	648.89		
Insurance,	2,032.25		
Bal. Sept. 30th, 1894,	1,415.83		
	$79,395.48		$79,395.48

MERIDEN, JANUARY 10, 1894.

This certifies that we have examined the accounts of the Superintendent and Treasurer of the Connecticut School for Boys, from October 1, 1893, to the end of the fiscal year,

September 30, 1894, and compared them with the vouchers and found them correct. The balance in the hands of the Superintendent was eighty-four dollars and eighty-two cents $84.82, and the balance in the hands of the Treasurer was one thousand three hundred and thirty-one dollars and one cent, $1,331.01. We also found that there was due the Institution the sum of three thousand one hundred and twenty-nine dollars and thirty-six cents, $3,129.36, for work done by the boys.

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

EXHIBIT NO. 2.

SHOWING THE WHOLE NUMBER OF BOYS THAT HAVE BEEN INMATES OF THE SCHOOL SINCE ITS OPENING IN MARCH, 1854.

Whole number since opening,		5,471
Number in School July 1, 1893,	432	
From Hartford County,	34	
New Haven County,	76	
Fairfield, "	50	
New London, "	7	
Middlesex, "	13	
Tolland, "	4	
Litchfield, "	10	
Windham, "	6	
Boarders,	4	
Number received on old Commitment,	46	
Number returned themselves,	10–260	
Total,	692	
Discharged in various ways,	211	
Number remaining in School Oct 1, 1894,	481	

EXHIBIT NO. 3.

SHOWING THE AGE OF BOYS AT COMMITMENT.

AGE.	PAST YEAR.	PREVIOUSLY	TOTAL.
Six,	1	9	10
Seven,	1	33	34
Eight,	1	78	79
Nine,	12	180	192
Ten,	9	517	526
Eleven,	17	595	612
Twelve	17	800	817
Thirteen,	33	831	864
Fourteen,	45	923	968
Fifteen,	51	936	987
Sixteen,	16	301	317
Seventeen,	1	39	40
Eighteen,	0	19	19
Nineteen,	0	5	5
Twenty,	0	1	1
Total,	204	5,267	5,471

EXHIBIT NO. 4.

SHOWING FOR WHAT OFFENSE COMMITTED.

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Theft,	53	2245	2298
Burglary,	7	264	271
Vagrancy,	24	330	354
Truancy,	12	705	707
Stubborness,	0	51	51
Obtaining goods under false pretense,	0	22	22
Arson,	0	39	39
Cruelty to Animals,	0	6	6
Sabbath Breaking,	0	1	1
Malicious Mischief,	0	71	71
Assault and Battery,	0	61	61
Breach of Peace,	1	60	61
Horse Stealing,	0	17	17
Disorderly Conduct,	0	13	13
Robbery,	0	7	7
Trespass,	0	19	19
Manslaughter,	0	1	1
Forgers,	0	7	7
Driving Horses without permission,	0	40	40
Lacivious Carriage,	0	4	4
Profane Cursing,	0	4	4
Getting on Cars,	0	3	3
Abusive Language,	0	3	3
Common Drunkard,	0	14	14
Misdemeanor,	0	10	10
Fornication,	0	1	1
Breaking Windows,	0	10	10
Attempt to Kill,	0	1	1
Attempt to Commit Rape,	0	10	10
Rape,	1	3	4
Disobedience,	1	20	21
Placing Obstructions on Railroads,	0	6	6
Receiving Stolen Goods,	0	1	1
Intoxication,	2	18	20
Boarders,	4	173	177
Incorrigibility,	92	893	985
Assault,	7	134	141
Total.	204	5,267	5,471

EXHIBIT NO. 5.

SHOWING BY WHAT AUTHORITY COMMITTED.

	PAST YEAR.	PREVIOUSLY	TOTAL.
Hartford Superior Court.,	0	39	39
New Haven "	0	73	73
Fairfield "	0	72	72
Litchfield "	0	28	28
Middlesex "	0	10	10
Tolland "	0	16	16
New London "	0	19	19
Windham "	1	8	9
New Haven Common Pleas Court,	0	1	1
Hartford Police Court,	16	655	671
New Haven "	35	881	916
New London "	2	90	92
Norwich "	3	138	141
Waterbury "	13	233	246
New Britain "	1	167	168
Bridgeport "	17	322	329
Meriden "	10	186	196
Stamford "	6	27	31
Norwalk "	3	3	6
Middletown "	4	38	42
Danbury "	6	29	35
Derby "	2	19	21
Wallingford "	1	5	6
Stafford "	0	3	3
Greenwich "	0	5	5
Ansonia "	1	4	5
Rockville "	0	3	3
Birmingham "	0	1	1
Haddam "	0	3	3
Huntington "	1	1	2
New Canaan "	0	1	1
Bethany Probate Court,	0	1	1
Justice Court, various Towns,	78	2023	2101
Boarders " "	4	173	177
Total,	204	5,267	5,471

EXHIBIT NO. 6

SHOWING THE VARIOUS WAYS BY WHICH THE BOYS HAVE LEFT THE INSTITUTION.

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Placed with Farmers,	9	535	544
Placed at various Trades,	7	59	66
Sentence expired,	0	941	941
Returned to Parents and Friends,	191	3592	3783
Sent to Deaf and Dumb Asylum,	0	1	1
Sent to Hospital,	1	6	7
Returned to Providence Reform School,	0	5	5
Discharged to go to sea,	0	7	7
" selectmen,	0	1	1
" for Defective Mittimus,	0	23	23
" by order of Court,	0	17	17
" by Legislature,	0	3	3
Remanded to Alternate Sentence,	0	33	33
Released to be tried for Incendiarism,	0	2	2
Died,	0	78	78
Boarders Dismissed,	3	164	167
Released to be tried for Assault,	0	2	2
Released to be tried for Burglary,	0	2	2
Sent to Children's Home,	0	3	3
To Enlist in the Army,	0	26	26
TOTAL,	211	5,500	5,711

EXHIBIT NO. 7.

SHOWING BIRTHPLACE OF THOSE COMMITTED.

Connecticut,	152
New York,	9
Massachusetts,	4
Florida,	1
France,	1
Canada,	6
Ireland,	2
Germany,	6
Italy,	9
England,	2
Russia,	2
Scotland,	2
Hungary,	1
Washington, D. C.,	1
New Jersey,	2
Virginia,	1
Pennsylvania,	1
South America,	1
Sweden,	1
Total,	204

EXHIBIT NO. 8.

PARENTAGE OF THOSE COMMITTED.

American,	77
Irish,	53
German,	15
French,	7
English,	9
Italian,	11
Scotch,	2
Russian,	2
Colored,	23
Austrian,	2
Sweden,	3
Total,	204

FARMER'S REPORT.

———o———

To the Superintendent of the Connecticut School for Boys.

The following tables show the amount of products grown during the year ending September 30, 1894, and the estimated value of the same. Also, an inventory of stock and tools used on the farm.

GROWN BY THE FARMER.

40	Tons English Hay,	$800.00
5	" Hayed Oats,	75.00
5	" Clover Hay,	75.00
6	" Meadow Hay,	60.00
12	" Sweet Corn Fodder,	120.00
2697	Pounds Pork,	242.73
106	" Leaf Lard,	10.60
47	" Rough Lard	3.76
4	Cows, (City Market,)	137.21
3	Calves, (3 days old,)	3.00
	Pigs,	123.90
	Service of Stock,	5.00
1326	Bushels of Potatoes,	928.20
3897	Bunches Celery,	194.85
3621	Dozen Sweet Corn,	362.10
43761	Quarts of Milk,	2,625.66
		$5,767.01

GROWN BY MR. JOHN GALLAGHER, COTTAGE A.

5134	Heads Cabbage,	$256.70
174	Bushels Ripe Tomatoes,	139.20
40	Bushels Green Tomatoes,	16.00
		$411.90

GROWN BY MR J. A. SMITH, COTTAGE B.

2007	Quarts Strawberries,	$301.05
1206	" Currents,	120.60
184	" Red Raspberries,	27.60
87	" Black Raspberries,	13.05
421	" Blackberries,	63.15
1806	Heads Early Cabbage,	90.30
255	" Cauliflower,	12.75
545	Bunches Rhubarb,	27.25
678	" Asparagus,	67.80
		$723.55

GROWN BY MR. JOHN H. PARISH, COTTAGE C.

78	Bushels Onions,	$78.00
3136	Bunches "	62.72
4000	" Radishes,	80.00
3000	Heads Lettuce,	60.00
1200	Bunches Beets,	24.00
12	Bushels Beets,	7.20
25	" Parsnips,	15.00
20	" Salsify,	10.00
		$336.92

GROWN BY MR. F. P. OWEN, COTTAGE D.

222	Bushels Rutabaga Turnips,	$133.20
224	" Green Peas,	211.60
		$344.80

GROWN BY MR. C. S. FOX, COTTAGE E.

97½	Bushels Snap Beans,	$59.50
78	" Shell "	46.80

33	Bushels	Dwarf Limas	$23.10
26	"	Large Limas,	18.20
			$147.60

GROWN BY MR. J. S. CRABB, NORTH DIVISION.

136	Bushels	Table Beets,	$81.60
346	"	Cattle Beets,	173.00
40	"	Beet Greens,	12.00
			$266.60

GROWN BY MR. T. H. MAGUIRE, SOUTH DIVISION.

2246	Pounds	Squash,	$44.92
100	Bushels	Cucumbers,	60.00
			104.92
		Total,	2,336.29
		Farmers,	5,767.01
			$8,103.30

Respectfully,

M. H. Marston, *Farmer.*

INVENTORY OF CARRIAGES, TOOL, ETC.

2 Ox Carts,	$75.00
2 Hay Carts,	50.00
2 One Horse Carts,	50.00
1 Deering Mower, old,	25.00
1 " " new,	60.00
1 Horse Lawn Mower,	25.00
1 Hay Rake,	15.00
1 Advance Tedder,	40.00
2 Cutaway Harrows,	20.00
1 Spring Tooth Harrow,	25.00
1 Smoothing Harrow,	10.00
1 A Harrow,	5.00
1 Iron Roller,	20.00

1	Lawn Roller,	$10.00
1	Land Side Plow,	10.00
1	Swivel "	10.00
1	Shovel "	5,00
1	Two Horse Cultivator,	15.00
2	One Horse Cultivators,	15,00
1	Breeds Weeder,	10.00
2	Wheel Barrows,	5 00
2	Sleds,	10.00
2	Seeds drills,	5.00
8	Rakes,	2.00
9	Garden Rakes,	3.50
8	Hay Forks,	4.00
16	Manure Forks,	8.00
5	Potato "	2.50
20	Spading "	10.00
15	Spading Shovels,	7.50
16	Shovels,	8.00
1	Root Cutter,	5.00
1	Hay "	7.50
2	Yokes,	5.00
3	Chains,	3.00
2	Potato Diggers,	25.00
10	Picks,	5.00
2	Platform Scales,	10.00
10	Axes,	5.00
100	Hoes,	20.00
2	Crowbars,	300
6	Baskets,	5.00
7	Scythes and Snathes,	7.00
1	Stone Boat,	5.00
2	Grind Stones,	3.00
8	Hand Lawn Mowers,	32.00
1	Top Buggy,	150.00
1	Phæton,	30,00
1	Three seated Carryall,	50.00
2	Two seated Carriages,	150.00
1	Surry,	75.00
2	Express Wagons,	20.00
1	Chair Wagon,	125.00

1	Lumber Wagon,	$25.00
1	Two seated Sleigh,	20.00
1	Cutter,	20.00
1	Chair Sleigh,	25.00
1	Business Sleigh,	15.00
4	Sets Single Harness,	40.00
2	" Heavy Double Harness,	60.00
1	" Light " "	20.00
	Total,	$1,546.00

INVENTORY LIVE STOCK.

2	Pairs Working Oxen,	$220.00
18	Cows,	720.00
10	Store Hogs,	250.00
20	Shoats,	120.00
5	Horses,	590.00
1	Jersey Bull,	50.00
		$1,950.00

THE SCHOOL AND ITS METHODS.

———o———

The Connecticut School for Boys, for delinquent and wayward boys, is beautifully located upon a high elevation of land in the City of Meriden, a thriving manufacturing city, with a population of 30,000 inhabitants, situated on the New York, New Haven & Hartford Railway, midway between the cities of Hartford and New Haven. The buildings of the Institution are less than a half mile from the center of the city, and are only ten minute's walk from the railroad station.

The farm belonging to the Institution lies in the rear of the buildings, and contains one hundred and ninety-five acres of land, one hundred acres of which are comparatively level, and well adapted to the raising of small fruits and garden vegetables, for which purposes it has already been largely appropriated. The balance of the land is somewhat broken, a portion being covered with a thick growth of small timber, while the remainder furnishes good pasturage for the stock. A living stream of pure water runs through the farm near its center.

The buildings of the Institution are mostly of brick, and are well constructed. They consist of one central building, five cottage buildings, a church edifice, a large boiler and coal house, an ice house, a bakery, a large hay and cow barn, a horse barn and carriage sheds, cattle sheds, hennery, piggery, wood-house, etc.

The main, or central building, fronts the east, is 300 feet long by 50 deep, the central portion being four stories high above the basement, the wings on either side being three

stories high. Attached to the rear of the main building, on the west, is also a wing 120 feet long by 40 feet wide, which is three stories high above the basement. In the basement story of the main building are located the kitchen, laundry, engine room, six store rooms, milk room two large play rooms two bath rooms and two rooms for storage of coal. The kitchen is furnished with four large steam kettles for cooking purposes, the steam being supplied from the boilers at the boiler house.

The bakery and bread room are conveniently connected with the kitchen, and are under the same supervision.

The laundry is supplied with three of the Nonpariel washing machines of the largest size, and a large mangle. The accommodations for drying clothes by steam are ample. There are also conveniences for making starch and for preparing soap for the machines by steam.

The engine room contains a boiler of 25-horse power, and engine of 15 horse power. The power is used in running the machinery of the laundry ; also for running eight sewing machines and the printing presses.

There are two play rooms, one for each division of the School, which are nicely furnished with settees sufficient to seat all of the boys, and the rooms are pleasantly decorated with pictures and paintings of various kinds, and are very well supplied with newspapers and magazines. These rooms furnish a pleasant place for the boys who desire to spend a portion of their play time in reading or in innocent games.

The bath rooms are supplied with a plunge and shower bath. By the aid of steam the shower can be made of any desired temperature. The accommodations are so ample that all of the boys can be thoroughly bathed in thirty minutes. The rooms are well provided with looking glasses, combs and brushes, and pleasant conveniences for obtaining cool drinking water at all times.

The first story of the main building above the basement contains one general office, a private office for the Superintendent, a reception room, a library room, three large school rooms with a seating capacity for one hundred boys each, two large wardrobe rooms for boys' Sunday clothing, one officers, sitting room, private dining room and kitchen for the Sup-

erintendent's family, a large dining room and kitchen for the officers of the Institution, two large dining rooms with a seating capacity for 375 boys, together with numerous closets, pantries, halls, etc.

The second story contains parlors and sitting rooms, bed chambers and closets for Superintendent's family, six rooms for officers, four large shop rooms and two sleeping halls.

The sleeping halls have a capacity for comfortably lodging 375 boys. The halls extend to the top of the building, and are sufficiently high to admit of two corridors above the main floor. The halls are light and pleasant, with good ventilation. They are furnished with single bedsteads, good mattresses, feather pillows, and plenty of bedding adapted to the season. The halls are also provided with six night closets, conveniently located, and with hydrants, from which good drinking water can be obtained at all times. A night watchman looks carefully after the wants of the boys during sleeping hours.

The third story, in the center and end wings, contains fifteen rooms, which are used for guest chambers and sleeping rooms for officers of the Institution. In the rear wing of this story, there is a large shop, where 75 boys labor at cane seating chairs. The shoe shop is also on this floor.

The fourth story of the central portion of the building is used for hospital purposes, with rooms for the nurses, etc. The hospital contains nine wards, and is provided with hot and cold water, and all conveniences necessary for making the sick comfortable.

In the rear of the main building there are two yards, surrounded by a high fence, in which the boys have ample time for exercise and play. There is also a yard of three acres of ground containing a pleasant grove of chestnut and oak trees, surrounded by a neat picket fence, five feet high, where the boys are often permitted to play, and where, in the summer time, they enjoy their holiday sports. The grounds surrounding the buildings are tastefully laid out, and are well set with ornamental shrubs and flowers. The boys in the main building, or Congregate Department of the School number about two hundred.

Five cottages have been built, that very comfortably accommodate fifty boys each. They are built of brick, are three stories high above the basement, and cost about $16,000 each. The basement contains a large play room, a room for storage, two bath rooms, and a fruit cellar. All the basement rooms are well lighted and warmed, where heat is needed.

The first story contains a large school room, handsomely seated and furnished, officers' private rooms, a bath room reception room, two dining rooms, a kitchen and pantry, and two halls.

The second story contains a sleeping hall for twenty boys a hospital room, a teacher's room, a bath room, a room for boys' Sunday clothings, a store room for bedding, etc., and a large shop room.

The third story contains a sleeping room for thirty boys, a bath room and a store room for bedding.

The buildings are finished in hard wood, are well furnished in every department, are lighted with gas supplied with water from the city reservoir, and warmed by steam.

The buildings differ, architecturally in their outside appearance, but are substantially the same in their interior arrangements. Each cottage is supervised by a gentleman and his wife, and one lady teacher. They are conducted on what is known as the Open, or Family Plan, the boys being held in their places by kindness and home influences, instead of the more arbitrary appliances of bolts, and bars and high fences.

The chapel edifice is a beautiful structure, with a seating capacity for 500 boys. It contains a large platform, with convenient side rooms, which afford excellent facilities for giving concerts and other appropriate entertainments. A large organ stands on the platform. The chapel was erected at a cost of about $15,000.

The boiler house is a solid structure of brick and stone work, 35 by 57 feet, and is two stories high. The lower story is 18 feet high, and contains a room for the three boilers of 60-horse power each, and a coal room that furnishes storage for 300 tons of coal. The boiler room contains a receiving tank, force pump and all apparatus necessary to supply all

the buildings with steam sufficient to warm them well and in the most approved manner, and to drive the machinery in the laundry and in the manufacturing departments. The chimney stack is 80 feet high, and gives an excellent draught in all kinds of weather. The upper story of the building contains a machine shop and living room for the engineer.

The farm buildings are commodious, and afford storage for all the carriages and smaller implements necessary for the farm and for the use of the Institution. The main barn is 83 feet in length by 42 feet in width, and is three stories high. The lower, or ground floor, is used as a manure cellar and for storing the winter supply of vegetables, the two being separated by a heavy cemented wall of stone. The capacity of these is about forty cords of manure and 2,000 bushels of vegetables. The middle story contains the stabling, running the entire length, arranged for the comfort and cleanliness of the stock, two rooms for such stock as need seclusion, a bedding room and bays for hay, which extend through the upper story to a height of 25 feet. The third story contains the driving floor, where the hay and fodder, as well as the grain, are well drawn and stored; a feed room and rooms for the smaller farm tools. Above the floor is a large space for grain or hay. The building is capable of storing seventy tons of hay, and is in all respects a model of convenience and economy of labor. Connected with this building by a carriage shed, is a horse barn, 30 feet in length by 24 feet in width, conveniently divided into stabling, a harness room, and a lodging room for the hostler, while above these is ample room for bedding, hay and other feed. There is also attached to the main barn a shed 54 feet by 20 feet, which furnishes additional stalls for cattle, as well as protection for the spring water with which the stock is supplied, and for the more bulky farm implements. Another building near these 33 feet by 20 feet, is used also for storing farm implements.

The piggery stands about 500 feet from the main, or school building, consists of a brick front, 34 feet by 20 feet in which the cooking for the swine is done, and also the slaughtering of the pork. Extending from this is a wooden building, 65 feet by 12 feet, where the swine are kept. This

is divided by movable partitions into eight pens, or less, if desired, and is arranged with special reference to comfort of the animals and ease and convenience in their care.

The neat stock kept upon the farm includes sixteen milch cows, two heifers, and two pairs of working oxen. None of these are full blooded, but are, with a single exception, Jersey or Ayrshire grades, and were nearly all raised upon the farm. No animals of this class are kept after they become unprofitable from old age, or failure of any kind, but are always converted into beef and sold. The services of five horses is required for freighting, driving and farm work. The swine kept are nearly all Chester White grades, and vary in number from twenty to forty. Very little grain is fed to them, as the number kept depends upon the amount of feed supplied by the Institution.

WATER SUPPLY.

The Institution is supplied with water from two sources. The water of a never-failing spring, one mile and a quarter away, owned by the Institution, is conducted by a three-inch pipe to the buildings, and furnshes sufficient for cooking and drinking purposes; also all needed water for the barns and piggery, and for irrigation at various points upon the farm. For the boilers, laundry, closets, and all general purposes, the supply is obtained from the city water works. The pressure of this water is about eighty-five pounds, and is sufficient to force the water to any part of the buildings in case of fire. The Institution has three convenient hydrants and hose, that may be used should the necessity for their use ever occur.

GAS.

The Institution is supplied with gas from the city gas works.

INDUSTRIES.

There are ten shops in the Institution that give employment to over four hundred boys. In the tailor shop, where the clothing worn by the boys is made and repaired, twenty boys are employed. There are about two hundred boys who work at cane-seating chairs in one large shop. A shoe

shop gives employment to a small class. The farm and garden, in the summer time, call for a class of from thirty to forty boys ; in the winter a small class cares for the stock and does the necessary work about the premises. From eight to ten boys work at the greenhouse and on the lawns. The laundry, dining rooms, kitchen, sleeping halls, etc., all require classes of from six to ten boys each.

FOOD.

The dietary of the Institution, while it does not embrace the variety ordinarily found on the tables of well-to-do people, still, the quality of the food daily placed before the boys could be no better. The bread is made from a good grade of white flour, the meats used are of the best quality, and the vegetables are supplied abundantly from the Institution gardens, and embrace a full variety of such kinds as are found in the best market gardens. Coffee is furnished for breakfast and supper, in which all the milk from the Institution dairy is used averaging from 100 to 200 quarts daily. Once a week a bountiful dinner of fish, or fish chowder is given. The tables are supplied daily with butter or molasses, and, on Sunday, pies are given at dinner and cakes for supper. On Thanksgiving day a bountiful turkey dinner is furnished, and, on all other holidays, the tables are spread with all the delicacies of the season. The boys are allowed all they want to eat at every meal, and no boy need ever leave the table hungry. The deprivation, or a change of food, is never allowed as a punishment. The tables are nicely covered with white oil cloth, and are spread with white porcelain ware, silver plated knives and forks, spoons and casters. Good manners are taught and required at meal time.

CLOTHING.

The boys of the institution are clothed in the best quality of all-wool gray cloth for pantaloons, and dark indigo blue army goods for jackets. Heavy Amoskeag Hickory is used for shirting ; their caps are made to order from all-wool blue cloth, and their shoes and stockings are of good quality. They dress in summer in lighter goods, according to the season.

RECREATION.

All holidays are devoted entirely to recreation and play. Portions of each week day, that will equal at least two hours of time, are also given for play. On Saturday afternoon, when the weather is suitable, the boys go to the ball grounds in an open field of many acres, where they enjoy full freedom in playing ball or such games as may suit their tastes best. Many opportunities are given to attend appropriate amusements at the Opera house in the city, and frequent rehearsals concerts and exhibitions are given for the benefit of the boys in our own chapel. They attend the Agricultural Fairs given in the park near by, and always take part in the ceremonies on the day devoted to the decoration of the soldiers' graves.

RELIGIOUS AND MORAL INSTRUCTION.

Two services are held in the chapel each Sabbath ; Sabbath School in the morning and preaching in the afternoon.

The "International Lesson Leaves" are used in the Sunday School. These lessons, with the explanation, prayers, responsive exercises and music, make a very interesting and profitable service.

The ministers from the several churches of the city preach in their turn at the Sunday afternoon service.

The Sisters of Mercy instruct the Catholic boys of the School an hour each alternate Sabbath, and priests are in attendance for Mass once in two weeks.

Devotional exercises are held morning and evening each day of the week, and grace is said before all meals.

There is a moral review every evening, at which time a record is made in a book, kept for the purpose, of every boy's conduct during that day. These records determine a boy's standing in the School at all times.

SCHOOL.

All the boys attend school three hours each week day eleven months in the year. The schools embrace ten grades or divisions, which give every boy the opportunity to attend a class exactly adapted to his scholarship, and, as a rule, substantial and praiseworthy progress is made in study. Much

attention is given to the subjects of reading, writing, spelling and arithmetic. Any boy, with an average mind, can, while at the school, obtain an education that will fit him to transact the ordinary business of life.

MUSIC.

Much attention is given to music, both vocal and instrumental. All the boys are taught vocal music, and about thirty boys are under constant training in instrumental or band music. Great proficiency is made in both departments.

SENTENCES.

Boys between the ages of seven and sixteen years can be sent to the school during minority by any court of record in the State. Parents or guardians may secure the admission of their sons or wards without process, by paying three dollars per week, quarterly in advance, for their board.

DISCHARGES.

Boys are dismissed on probation after they obtain the "Honor Grade," and this grade, by uniform good conduct, can be attained in one year after entering the School. By indifferent or bad conduct, promotions are lost, and, as a result the time for a boy to remain it the School is lengthened.

All boys that go out on leave of absence are required to communicate with the Institution once in six months, and by failing to do so, are at once looked after by the authorities of the School. A record is kept, as far as is possible, of every boy's conduct after he leaves the Institution.

The Board of Trustees has discretionary power to dismiss any boy from the Institution whenever the interest of the School or the boy will be promoted by such dismissal.

NAMES, RESIDENCES, COMMISSION AND RETIREMENT OF THE TRUSTEES OF THE CONNECTICUT SCHOOL FOR BOYS, FROM ITS COMMENCEMENT TO THE PRESENT TIME.

Date of Commission.			Date of Retirement.
1851	Gideon Wells,	Hartford,	1853
1851	Phileman Hoadley,	New Haven,	1857
1851	E. S. Abernethy,	Bridgeport,	1853
1851	A. N. Baldwin,	West Milford,	1855
1851	Philo M. Jackson,	Norwich,	declined,
1851	Erastus Lester,	Plainfield,	1854
1851	Henry D. Smith,	Middletown,	1853
1851	John H. Brockway,	Ellington,	1852
1853	Philip Ripley,	Hartford, died in office,	1863
1853	David Patchen,	Weston,	1854
1853	John P. Gulliver,	Norwich,	1854
1853	John S. Yoemans,	Columbia,	1856
1853	James Phelps,	Essex,	1855
1854	Fred S. Wildman,	Danbury,	1858
1854	Moses Pierce,	Norwich,	1856
1854	John Gallup, (2d)	Brooklyn,	1858
1855	Sylvester Spencer,	Litchfield, resigned,	1858
1855	Elihu Spencer,	Middletown,	declined,
1856	Moses Culver,	Middletown,	1858
1856	Thomas Clark,	Coventry,	1860
1856	W. P. Benjamin,	New London,	1876
1857	W. S. Charnley,	New Haven,	declined,
1858	E. W. Hatch,	Meriden, resigned,	1859
1858	Horace Gaylord,	Ashford,	1862
1858	David P. Nicholas,	Danbury,	1875
1858	Thomas A. Miller,	Torrington,	1859
1858	Benjamin Douglass,	Middletown,	1876
1859	Hiram Foster,	Meriden,	1873
1859	Daniel G. Platt,	Washington, d. in office,	1871
1859	Henry McCray,	Ellington,	1876

Date of Commission.			Date of Retirement.
1862	Roswell Brown,	Hartford, d. in office,	1877
1862	William Swift,	Windham,	1866
1863	Henry B Hubbard,	Middletown,	declined
1866	James B. Whitcomb,	Brooklyn,	1874
1871	George Langdon,	Plymouth,	1875
1873	Hiram A. Yale,	Meriden,	1877
1874	S. B. Cocks,	Huntington, resigned,	1876
1874	F. O. Bennett,	Willimantic, retired,	1882
1875	Delos H. Stevens.	Barkhamstead, retired	1889
1875	Chas. Fitzgerald,	Middletown, retired,	1891
1875	Edw'd W. Seymour,	Litchfield, retired,	1876
1875	Goodwin Collier,	Hartford, retired,	1876
1875	Chas L. English,	New Haven,	resigned
1876	John M. Brewer,	Norwich, died in office,	1878
1876	G. H. Preston, M. D.,	Tolland, " "	1883
1877	Vincent Colyer,	Darien, retired,	1886
1877	John L. Houston,	Thomsonville,	still in office
1878	A. P. Willoughby,	Norwich, retired,	1879
1879	Charles Fabrique,	N. Haven, d. in office,	1889
1879	J. S. Lathrop,	Norwich, retired,	1891
1879	Theodore Bird,	Bethlehem, retired,	1891
1882	Albertus S. Bruce,	Pomfret, retired,	1893
1883	Charles F. Sumner,	Bolton, still in office.	
1886	James K. Butler,	Darien, retired,	1893
1889	James N. States,	New Haven, still in office,	
1891	Herman Hoffman,	New Preston,	"
1891	Nathan D. Bates,	Preston,	"
1893	Samuel Thatcher,	Warrenville, retired,	1894
1893	John McCarthy,	Danbury,	still in office
1891	James Donovan,	Middletown,	"
1894	Davis A. Baker,	Warrenville	"

RESIDENT TRUSTEES.

1877	Isaac C. Lewis,	Meriden, died in office,	1894
1877	Charles L. Upham,	" retired,	1891
1877	Owen B. Arnold,	" "	1891
1887	D. S. Williams,	" "	1893

Date of Commission.			Date of Retirement.
1891	SETH J. HALL,	Meriden,	still in office.
1891	C. H. S. DAVIS,	"	"
1893	JOHN C. BYXBEE,	"	"
1894	N. L. BRADLEY,	"	"

NAMES OF SUPERINTENDENTS

OF THE

CONNECTICUT SCHOOL FOR BOYS.

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Date of Appointment.	NAMES.	Date of Retirement.
1853	Philimon Hoadely,	1855
1854	Saxton B. Little, Ass't Supt.,	1875
1855	Roswell Hawley, M. D.,	1859
1858	Edward W. Hatch, M. D.,	Died Feb. 7, 1874
1874	Saxton B. Little, Acting Supt.,	July 1, 1874
1874	Edward Ingham,	July 1, 1876
1876	S. B. Cocks,	Dec. 1, 1877
1877	J. W. Brown, Acting Supt.,	Apr. 23, 1878
1878	Geo. E. Howe,	Died in office, Nov. 23, 1893
1893	Mrs. F. M. Howe,	Apr. 11, 1894
1894	Rev. Samuel Thatcher,	still in office.

FORM OF INDENTURE

ADOPTED BY THE TRUSTEES.

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To the Trustees of the Connecticut School for Boys :

I hereby request that the boy named

received as indentured, according to the law, to the Connecticut School for Boys, at MERIDEN, and I hereby bind myself and agree to the following conditions, viz :

The price of board, education, training and clothing for said boy shall be at the rate of THREE DOLLARS per week, payable quarterly, in advance, and the said is bound to remain in the Institution for the term of months, entitled to the same supervision, medical treatment, support and education, and subject to the same regulations, employment and restraint as all other inmates of said School.

(Signed)

CIRCULAR OF

Information to Parents and Guardians.

—o—

We take this method of informing you that your was this day duly received at this Institution, here to remain during his minority, or until otherwise discharged in accordance with the rules of the School. Any boy, by uniform good conduct, can reach his "Honor Grade" in one year from the time he enters the School. He is then given a probationary discharge to go to his home, where he will be permitted to remain as long as he does well, If his conduct in the School is not good, the time for his receiving his probationary discharge will be increased. For your further information, it is proper to state that the Institution is not a prison, but a School for detention and reform where the inmates receive such instruction and training as are best adapted to form and perpetuate a virtuous character to establish habits of industry, and to advance them in those branches of knowledge which are taught in the Common Schools of the State. They are here provided with a home in every way pleasant and comfortable, are furnished with steady employment, of a kind that will aid them in earning an honest living after they leave the School. They have appropriate seasons for recreation and play, are well fed and clothed, and, when sick, have the best of care and medical attendance. They attend school regularly six days of the week, are taught by efficient and experienced teachers, and on Sunday enjoy the privileges of the Sabbath School and regular Chapel service, over which some minister of the Gospel from one of the city churches presides. The Catholic boys of the School receive one hour of instruction each Sabbath from the Sisters of Mercy.

In order to accomplish the wise ends for which this Institution was established, to wit: the reformation of boys intrusted to its care, it will be necessary for them to remain in the School for a sufficient length of time to receive such training and discipline as will serve to reform their evil ways, and to establish in them correct moral principles and habits of industry.

Applications for the discharge of boys from the Institution are frequently made in a short time after their commitment, but of course these applications are not entertained. Experience has taught the management that the best interests of the School are promoted by treating the boys all alike, and by requiring all to procure their "Honor Badge," before leaving the School. If there is a deviation from the rule in a *single* case, every other boy has the *right* to ask for the same deviation in *his* case, and the Institution would lose its reformatory character.

Parents, guardians and other near friends are permitted to visit the boys on the first Wednesday of each month, at which time no pains will be spared in giving all information sought for in relation to the standing of any boy it the School.

The boys are permitted to write to their friends once a month, and the friends are allowed to write to the boys at their pleasure. In case of serious illness of any boy, his friends will at once be advised of his condition.

AMENDMENTS TO LAW

Relating to the Connecticut School for Boys, Meriden.

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Be it enacted by the Senate and House of Representatives in General Assembly convened.

Section 1. Whenever any boy under the age of sixteen years shall be convicted of any crime or misdemeanor, punishable by fine or imprisonment other than imprisonment for life, the Court, or Justice of the Peace, as the case may be, may commit him to the Connecticut School for Boys, to remain until he shall arrive at the age of twenty-one years, unless sooner discharged by the Board of Trustees. And the Judges of the Criminal and Police Courts of the State, and Judges of the Peace, shall have power to commit to the Connecticut School for Boys: First, any boy under sixteen years of age who may be liable to punishment by imprisonment under any existing law of the State, or any law that may be enacted and in force in the State: second, any boy under sixteen years of age, with the consent of his parents or guardian, against whom any charge of committing any crime or misdemeanor shall have been made, the punishment of which, on conviction, would be confinement in jail or prison; third, any boy under sixteen years of age, who is destitute of a suitable home and adequate means of obtaining an honest living, or who is in danger of being brought up, or is brought up, to lead an idle or vicious life; fourth, any boy under sixteen years of age, who is incorrigible, or habitually disregards the com-

mands of his father or his mother or guardian, who leads a vagrant life, or resorts to immoral places or practices, or neglects or refuses to perform labor suitable to his years and condition, or to attend school.

Sec. 2. That every boy sent to the Connecticut School for Boys shall remain until he is twenty-one years of age, unless sooner discharged or bound as an apprentice; but no boy shall be retained after the Superintendent shall have reported him fully reformed.

Sec. 3. That whenever there shall be as large a number of boys in the School as can be properly accommodated it shall be the duty of the President of the Board of Trustees to give notice to the Criminal and Police Courts of the fact, whereupon no boys shall be sent to the School by said Courts until notice shall be given them by the President of the Board that more can be received.

Sec 4. If any person shall entice or attempt to entice away from said School, any boy legally committed to the same, or shall knowingly harbor, conceal or aid in harboring or concealing any boy who shall have escaped from said School, such person shall, upon conviction thereof, be deemed guilty of a misdemeanor, and shall pay a fine of not less than ten or more than one hundred dollars, which shall be paid to the Treaurer of the Board of Trustees; and every sheriff, deputy sheriff, constable or officer of the local police, or any officer or employee of said School, shall have power, and it is hereby made his duty, to arrest any boy, when in his power to do so who shall have escaped from said School, and return him thereto.

Sec. 5. That the Trustees shall have full power to place any boy committed as herein described, during minority, at such employment, and cause him to be instructed in such branches of useful knowledge as may be suitable to his years and capacity as they may see fit: and they may, with the consent of any such boy, or his parents or guardians, bind him out as an apprentice during his minority, or for a shorter period, to learn a trade, or to other employment, as in their judgment will tend to his future benefit; and the President of the Board shall, for such a purpose, have power to execute and deliver, on behalf of the said Board, indentures of

apprenticeship for any such boy, and such indentures shall have the same force and effect as indentures of apprenticeship executed by his legal guardian, and shall be filed with the records in the office of the Connecticut School for Boys.

Sec. 6. In case any boy so apprenticed shall prove untrustworthy and unreformed, the Trustees may, at their discretion receive such boys into the Connecticut School for Boys, to be held in the same manner as before his said apprenticeship, and may there upon cancel the indentures of such boy. And if, in the opinion of the Trustees, any boy apprenticed out by them shall have an unsuitable home, or if the person to whom such boy is indentured shall become unfit or incapable to properly raise or take care of him, the Trustees may, at their discretion, return such boy to the School.

Sec. 7. Whenever a boy is dismissed from the School to his parents, or to otherwise care of himself (except by indentures, as in the foregoing section,) he shall be dismissed on probation merely, and the Board of Trustees shall have power to send for and return him to the School, when, in opinion of a majority of the members of said Board, the interest of the boy will be promoted by such return.

Sec. 8. All acts inconsistent with the foregoing are hereby repealed.

An Act in Addition to an Act Entitled "An Act Concerning Education."

Resolved by this Assumbly: That in the several Reform Schools in this State, equal privileges shall be granted to clergyman of all religious denominations to impart religious instruction to the inmates thereof, and that every opportunity be allowed such clergymen to give to the inmates belonging to their respective denominations such religious and moral instruction as said clergymen may desire, and the Trustees of said Institution shall prescribe reasonable times and places, not inconsistent with the proper management of said Institution, when and where such instruction may be given, and such instruction shall be open to all who may choose to attend.

Approved July 25, 1874.

BY-LAWS.

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MEETINGS OF THE TRUSTEES.

Sec. 1. There shall be a regular meeting of the Board of Trustees held at the School in MERIDEN, on the second Wednesday of January, April, July and October in each year, and the July meeting shall be the annual meeting.

Sec. 2. Special meetings shall be called by the President of the Board at the written request of two members, provided that ample notice of such meetings shall be given.

Sec. 3. A majority of the members shall constitute a quorum for the transaction of business, but a smaller number present at any regular or special meeting may adjourn to any specified time.

Sec. 4. The Board of Trustees shall be organized annually at the regular meeting held in July, by the election, by ballot, of a President, Secretary, Treasurer, an Executive Committee, to consist of three members, and an Auditing Committee to consist of two members.

PRESIDENT.

Sec. 5. It shall be the duty of the President to preside at all the meetings of the Board, but in his absence, the Board shall appoint a chairman *pro tem.*

SECRETARY.

Sec. 6. It shall be the duty of the Secretary to keep an accurate record of all proceedings of the Board in a book provided for that purpose, which shall, at all times, be open to the inspection of any members; to prepare all documents and

statements which may be ordered by the Board; to take charge of all communication, and reply thereto in accordance with such instructions as he may receive from the Board or Executive Committee.

TREASURER.

Sec. 7. The Treasurer shall receive and disburse the moneys of the Institution, and keep a true and just account of the same. He shall pay no bills except on an order drawn by the Superintendent, and countersigned by the Executive Committee, and for the faithful performance of his duties he shall give a satisfactory bond in the sum of eight thousand dollars

EXECUTIVE COMMITTEE.

Sec. 8 It shall be the duty of the Executive Committee to make or order the Superintendent to make, all purchases for the School, to authorize such repairs as may, from time to time, be necessary; but no expenditures for repairs exceeding one hundred dollars shall be authorized except by the Board. They shall examine as to whether economy is observed in the different department of the School, and the quantity and quality of food and clothing furnished. They shall, once in each month, or oftener, if they choose, without notice to the Superintendent or other officers, inspect the School buildings, and all the departments, rooms and closets thereof, and see that all are kept perfectly clean and neat; they shall inquire into the behavior of all officers and employees, and in a book, kept for that purpose, enter all their proceedings and observations, which book shall be laid before the Board at every meeting. They shall also, at each monthly meeting, examine all bills presented by the Superintendent and, if found correct, approve the same.

See. 9. There shall be as many meetings of the Executive Committee as the interests of the School require.

AUDITING COMMITTEE.

Sec. 10. It shall be the duty of the Auditing Committee to examine the accounts of the Treasurer thoroughly and minutely, up to the 30th day of September in each year, and report thereon to the Board at the next regular meeting.

OFFICERS.

Sec. 11. The following named officers of the School shall be appointed by the Board of Trustees, whenever their services may be required, viz ; a Superintendent, an Assistant Superintendent, Bookkeeper, Matron, Teachers, Overseers of the workshops, and a Farmer.

Sec. 12. The several officers shall hold their appointment during the pleasure of the Board, and no resignation shall take effect until three months after being tendered in writing except by consent of the Board of Trustees.

SUPERINTENDENT.

Sec. 13. The Superintendent shall have the general charge of the Institution.

He shall see that the subordinate officers are punctual and faithful in the discharge of their respective duties, and that the regulations and by-laws are carefully observed.

He shall keep a journal and make a record of all occurrences worthy of notice, which shall be subject to the inspection of any member of the Board.

He shall perform all the correspondence, keeping files of all letters received and copies of those sent, as far as important for reference. In suitable books he shall keep regular and complete accounts of all property entrusted to his care, showing the expenses and income of the Institution.

He shall make out and present to the Treasurer of the Institution the bill for weekly board of inmates, and perform all the duties of this department according to law.

Under the advice and direction of the Executive Committee, he shall procure the necessary supplies for the Institution, and purchase all such articles and materials as may be wanted for the support and employment of the boys, and dispose of all articles raised on the farm, or manufactured by them, which are not wanted for use.

In a suitable book, he shall keep an account of all purchases, and the cost of delivering the same at the Institution.

He shall daily inspect every part of the premises, and have a watchful care over the inmates, and be responsible for the proper care and discipline of the boys.

He, or the Assistant Superintendent, shall examine all packages and letters received for the boys, and shall examine their letters before being sent away.

He shall see that they receive no detriment to health for want for sufficient clothing by day or by night, from wet or cold, or from other exposure, and that the rooms and buildings are properly warmed and ventilated.

He shall employ, whenever necessary, suitable persons for any temporary services not provided for in these by-laws and report the same to the Executive Committee.

At each quartely meeting he shall report to the Board the number of boys committed to the Connecticut School for Boys, also communicate full information of the state of the Institution, and make such suggestions as he may think proper for the consideration of the Board.

At the July meeting he shall furnish the Board with a duplicate copy of his accounts, presented to the State Comptroller of Public Account, up to the 30th day of June; also a full schedule of all property of the Institution, including everything in the care of the farmer.

He shall at all times be ready to perform whatever other services may be required by the Board of Trustees, for the benefit of the Institution.

The Superintendent shall have the direction of the moral and religious instruction of the inmates. He shall perform devotional service, morning and evening ; have charge of the Sabbath School, and obtain such aid from the reverend clergy in the vicinity as may be necessary.

He shall occasionally give familiar expositions of moral and religious duty in such a manner as he shall deem most conductive to the good of the boys, and at such times as may be determined on by consultation with the Trustees.

He shall mingle freely with the boys, in kind, familiar intercourse, and spend as much time with them in conversation as he may think for their benefit, and as will be consistent with the proper performance of his duties and his position in the Institution.

At the quarterly meeting of the Trustees in July, he shall make a report, stating all facts respecting the reformatory influence effectively made use of in this Institution.

ASSISTANT SUPERINTENDENT.

Sec. 14. The Assistant Superintendent shall assume and perform all the duties of the Superintendent during his absence or inability.

THE MATRON.

Sec. 15. The Matron shall have the general charge and direction of all the domestic arrangements of the family, and shall see that cleanliness, order and propriety are uniformly maintained in her department.

She shall see that all female assistants, except, teachers, are diligent and faithful in the discharge of their respective duties, discreet and regular in their deportment, and strict in their observance of all the regulations of the Institution, and shall report to the Superintendent any remissness that may come to her knowledge.

She shall confer and advise with the Superintendent respecting the duties of the persons employed in the departments under her charge, and also as to the general management of the house.

TEACHERS.

Sec. 16. The Teachers shall instruct the boys in such branches of education as may be required by the Superintendent, and shall use all proper means to inspire them with a love of study, and lead them justly to estimate the value of a sound and practical education, and shall constantly strive, by precept and example, to impress on their minds the importance of good order, self-government, and purity of body and mind.

They shall take charge of the boys at all times in the school-rooms, and shall require them to be promptly in their places at the appointed time, unless they are absent by permission of the Superintendent.

They shall attend to the cleanliness and good order of the school-rooms, and shall be responsible for the safety, care and preservation of all books, furniture, apparatus and fixtures provided for the same ; and by strict personal examination, see that no injury or waste is suffered.

They shall assist in the Sabbath School, in the care of the boys on the Sabbath, in vocal music, and the principle teacher shall act as librarian to the boys.

OVERSEERS OF WORKSHOPS.

Sec. 17. The overseers of the workshops shall take charge of all tools used in their respective departments, and see that the same are carefully preserved and accounted for; shall see that all stock and material are worked with prudence and economy and are properly manufactured. They shall keep accurate accounts of the number of boys and time employed each day, of the work done and all articles made and how disposed of. They shall attend to the cleaning, warming and ventilation, and keep a daily record of the temperture of their workshops.

They shall have charge of the boys during the workhours in the shops ; shall exercise a prudent and judicious oversight see that industry and good order are constantly observed, and return them to the yard, or such other place, and at such time as may be ordered by the Superintendent. They shall also assist the teacher if requested, in their duties on the Sabbath, and in the Sabbath School.

WATCHMAN.

Sec. 18. The Superintendent will have power, with the approbation of the Executive Committee, to appoint one or more watchman for night duty, whenever it is considered necessary for the safety of the Institution.

The watchman on duty shall, if required perform a regular patrol throughout and around the building. He shall use the utmost vigilance to guard against damages by fire, to prevent escapes, and promptly notify the Superintendent on the first cause of alarm. He shall ring the bell in the morning, and at other times as may be directed, and perform any other service required by the Superintendent.

FARMER.

Sec. 19. The Farmer, under general or specific directions of the Superintendent, shall have charge of all the farming

operations, and shall be responsible for the proper management, good order and economical use of everything connected therewith, and shall use every means in his power to increase and preserve the products of the farm.

He shall take charge of work with, and be responsible for such boys as the Superintendent may detail to be employed on the farm, and must patiently and perseveringly instruct them in the various kind of farm work; require of them prompt obedience, and must, by example, together with constant and vigilant supervision, teach them to faithfully perform all duties required of them.

He shall see that all domestic animals are cared for in the best manner, well fed, properly cleaned and kindly treated.

He shall keep an accurate account of everything purchased, for the labor performed, add the amount of each kind of Produce raised on the farm.

He shall see that all rules and regulations of the Institution are strictly observed by all persons under his care, and shall promptly report to the Superintendent any one who may refuse or neglect to comply therewith.

THE LIBRARY.

Sec. 20. A library of well selected books and maps, and of Sunday School books, shall be kept at the School for the use and improvement of inmates thereof.

The Superintendent, Librarian and Chairman of the Executive Committee shall be a standing Committee on the Library, who shall have in charge the efforts, ways and means to promote this department of the Institution, and they shall report to the Board of Trustees, at the quartely meetings, the progress and condition of the Library, with a full list of all donations received for this object.

VISITORS.

Sec. 21 Visitors will always be welcome to visit the School between the hours of 9 A. M. and 4 P. M. on week days, and on Sunday for the purpose of attending the religious exercises but on that day they must leave immediately after the services are ended.

Parents will not be permitted to see their children oftener

than once a month, unless by special permission of the Superintendent ; and any article designed for any inmate must pass through the hands of the officer in attendance.

Visitors passing through the house or shops must not go among the boys, or address any conversation to them, except by permission of the attending officer.

Any visitors who shall attempt to give any inmate tobacco or other articles secretly, shall be altogether excluded from the premises.

Visitors shall not be permitted in or on the premises except attended by an officer of the Institution.

GENERAL REGULATIONS.

Sec. 22. The distribution of time for each working day shall not be less than six hours for labor, four hours for school, and from four and one-half to five hours for devotional exercises, incidental duties and recreation.

The time of rising shall be half past five o clock A. M., from the first day of March to the first day of November, and at six o'clock during the other four months. The time of retiring shall be at eight o'clock P. M.

All persons having requisite duties to perform shall rise promptly at the ringing of the morning bell.

No person regularly employed at the Institution shall be absent from his or her duties without permission from the Superintendent, or his assistant, and persons getting such permission will be required to procure a substitute, to be approved by the Superintendent, to fulfill his or her duties during their absence.

It shall be incumbent on each officer to see that all rules and regulations are strictly observed, and they shall promptly report any failures therein. As the great object is *reform* the intercourse of *all* with the boys should be so conducted as to convince them that this object is the chief end and aim of the School.

Every boy shall, at all times, be in charge of some responsible person, unless otherwise directed ; any boy escaping by or through the neglect or carelessness of any officer, the whole or part of the expense incurred in his capture may be

charged to such officer and deducted from his salary by order of the Trustees.

No person shall take or detain a boy from the performance of one duty to discharge another, without direction from the Superintendent; and no boy shall be kept or allowed to remain out of School without special permission from the Superintendent.

Any person having charge of the boys during their time of recreation, shall see that a kind and proper tone of feeling is observed among them, and that they do not use violence, or injure each other's clothing, mar or deface the buildings, fixtures or furniture.

All persons employed at the Institution, who are in health and can leave their appropriate duties at the time, shall attend the daily devotional exercises, and the religious services on the Sabbath, unless special leave of absence is granted.

No spirituous liquors or intoxicating drinks shall be brought to the Institution, unless by order of the physician. No officer or assistant shall at any time make use of such liquor, nor shall any one make use of tobacco, or smoke a pipe or cigar on or about the premises.

No tobacco shall be furnished or allowed to the delinquents in any form.

No officer shall be compelled to perform any duty inconsistent with those regularly assigned to him; but as this Institution is to be a family, as well as a School for detention and reformation, duties will occur growing out of this double relation which no by-laws can clearly indicate or provide for; therefore *all* are expected to act agreeably to the *spirit* as well as the *letter* of these rules and regulations, and hold themselves ready at all times for any emergency to aid in preserving order preventing escapes and maintaining the rules and discipline of the School, and by general and constant acts, of accommodation, firmness, and kindness accomplish the desired object.

DISCIPLINE.

The discipline shall be that of the family, the School, the workshop and the farm, and not that of the prison. The inmates are to be watched over as pupils, and not guarded as

prisoners or criminals ; and there shall be no more restraint than shall be necessary to develope good, and repress bad qualities. Self-instruction, self-desire to labor, and self-government shall be inculcated and encouraged as the best culture, as well as the most effective discipline.

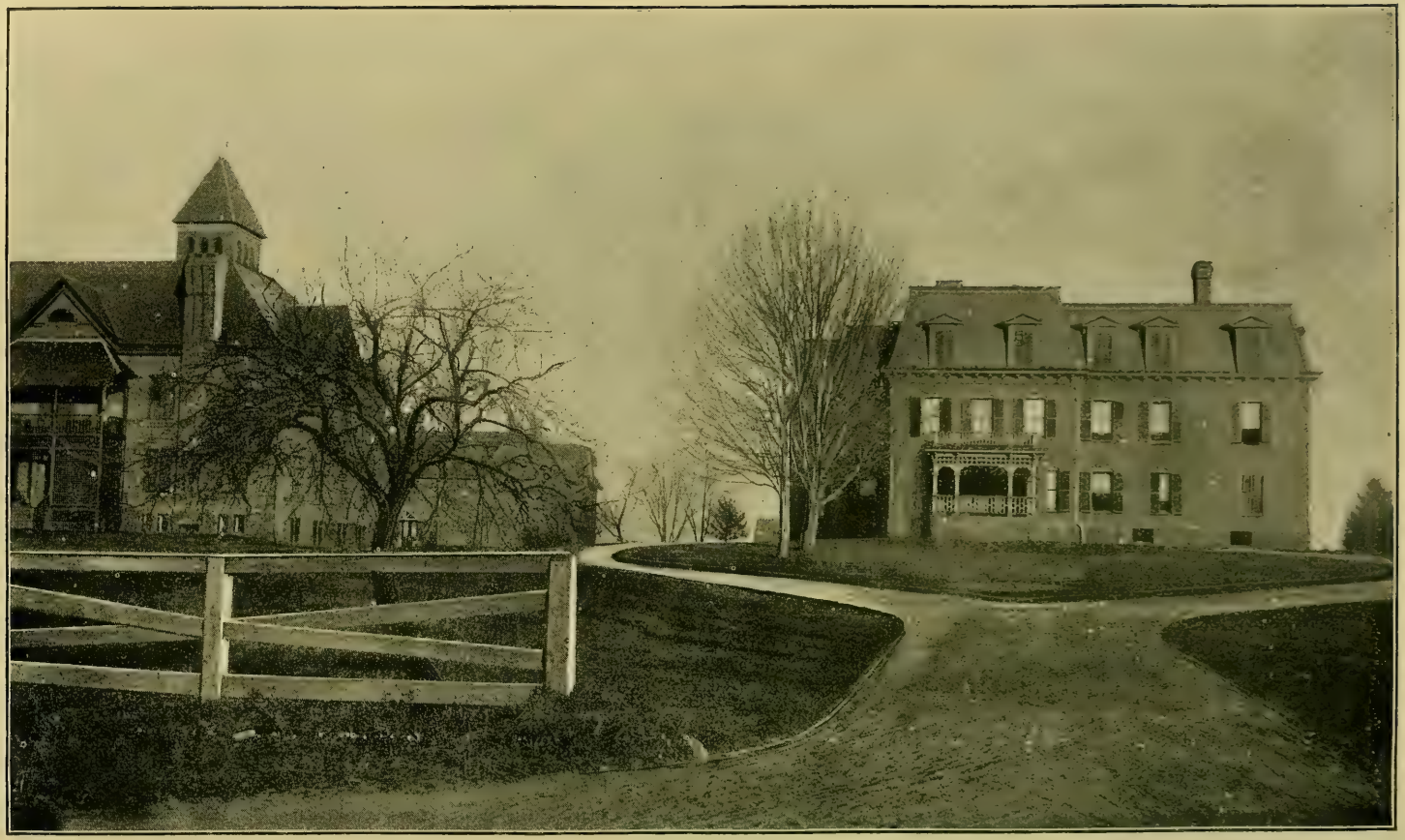
Punishment shall be imposed as a public judgment, in manner and form to be prescribed by the Superintendent, and never under excitement of the moment. Its severity shall always be proportionate to the magnitude of the offense. It shall consist of deprivation of play or marks of disapprobation or demerit, solitary confinement, and the use of the rod, as resorted to in well regulated families. Personal chastisement shall only be inflicted for some high misdemeanor or repeated offense, and only on the order of the Superintendent ; and in case of severe punishment, only in his presence, or that of his assistant.

These By-laws, or any part thereof, may be altered, amended, or repealed, at any regular meeting of the Board of Trustees.

Amended July 14, 1886.

VIEW FROM EAST.

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS, AT MIDDLETOWN.



ENTRANCE TO SCHOOL GROUNDS.

VIEW FROM THE NORTH.

SUPERINTENDENT'S HOME.

CHAPEL.

GREEN HOUSE AND FESSENDEN HALL.

FARM HOUSE AND BARN

COOKING SCHOOL.

TWENTY-FOURTH AND TWENTY-FIFTH

REPORTS

— OF THE —

BOARD OF DIRECTORS

— OF THE —

CONNECTICUT

Industrial School for Girls.

Presented to the General Assembly at its Session in January, 1895.

MIDDLETOWN, CONN.:
PELTON & KING, PRINTERS AND BOOKBINDERS.
1894.

Board of Directors and Officers.

HENRY D. SMITH, *President*, - - - - - - PLANTSVILLE.

CLARENCE E. BACON, *Secretary, and Treasurer*, - MIDDLETOWN.

State Directors (ex-officio).

GOVERNOR LUZON B. MORRIS, - - - - - - NEW HAVEN.

LIEUT.-GOVERNOR ERNEST CADY, - - - - - HARTFORD.

SECRETARY OF STATE JOHN J. PHELAN, - - - BRIDGEPORT.

Directors Elected.

WHOSE TERM OF OFFICE EXPIRES RESPECTIVELY IN

1895.

JOHN M. VAN VLECK, - - - - - - - MIDDLETOWN.

CLARENCE E. BACON, - - - - - - - MIDDLETOWN.

LORRIN A. COOKE, - - - - - - - - BARKHAMSTED.

STEPHEN O. BOWEN, - - - - - - - EASTFORD.

1896.

SAMUEL RUSSELL, - - - - - - - - MIDDLETOWN.

LOREN A. GALLUP, - - - - - - - - NORWICH.

MORRIS W. SEYMOUR, - - - - - - - BRIDGEPORT.

RODNEY DENNIS, - - - - - - - - HARTFORD.

1897.

H. D. SMITH, - - - - - - - - - PLANTSVILLE.

WILLIAM H. BURROWS, - - - - - - - MIDDLETOWN.

EDWARD PAYNE, - - - - - - - - MIDDLETOWN.

Executive Committee.

J. M. VAN VLECK, WILLIAM H. BURROWS,
SAMUEL RUSSELL, CLARENCE E. BACON,
EDWARD PAYNE.

Visiting Committees of Ladies for 1894-95.

January and July.

MRS. J. H. BUNCE, - - - - - - - MIDDLETOWN.
MRS. L. L. CAMP, - - - - - - - - NEW HAVEN.

February and August.

MISS EMILY GILMAN, - - - - - - - NORWICH.
MRS. A. S. CHURCHILL, - - - - - - NEW BRITAIN.

March and September.

MRS. M. WALL, - - - - - - - - MIDDLETOWN.
MRS. JAMES LAWTON, - - - - - - MIDDLETOWN.

April and October.

MISS MARGARET S. HUBBARD, - - - - MIDDLETOWN.
MRS. LYMAN MILLS, - - - - - - - MIDDLEFIELD.

May and November.

MRS. NELLIE DOUGLAS, - - - - - - MIDDLETOWN.
MRS. ALEXANDER HAWLEY, - - - - - BRIDGEPORT.

June and December.

MRS. WATSON WEBB, - - - - - - - HARTFORD.
MRS. ARTHUR F. EGGLESTON, - - - - HARTFORD.

RESIDENT OFFICERS.

WILLIAM G. FAIRBANK, - - - - - - - *Superintendent.*
MARGARET E. FAIRBANK, *Visiting Agent and Assistant Superintendent.*
WILLIAM E. FAIRBANK, *General Assistant and Acting School Visitor.*
CLARA B. FAIRBANK, - - - - - - - *Office Assistant.*

COTTAGE HOME.

MISS M. MILLER, - - - - - - - - - - *Matron.*
MISS N. ELLARCHAR, - - - - - - - *Assistant Matron.*

PRATT HOME.

MISS K. M. AYRES, - - - - - - - - - *Matron.*
MRS. C. W. ATTENBOROUGH, - - - - *Assistant Matron.*

STREET HOME.

MRS. L. PUCCI, - - - - - - - - - - *Matron.*
MRS. M. HANSON, - - - - - - - - *Assistant Matron.*

ALLYN HOME.

MRS. C. M. WILBUR, - - - - - - - - - *Matron.*
MISS L. EVERS, - - - - - - - - *Assistant Matron.*

ROGERS HOME.

MISS M. A. PARKER, - - - - - - - - - *Matron.*
MRS. F. D. PARMALEE, - - - - - - *Assistant Matron.*

RUSSELL HOME.

MISS B. ROBINS, - - - - - - - - - - *Matron.*
MRS. A. G. MCINTYRE, - - - - - - *Assistant Matron.*

MRS. D. T. COATES, - - - - *Assistant Matron, Farm House.*
MISS E. EATON, - - - - - - *Assistant Matron, Office.*

TEACHERS.

MISS A. TRELOAR, - - - - - - - - *First School.*
MRS. M. B. NASON, - - - - - - - - *Second School.*
MISS E. TOWNSEND, - - - - - - - - *Third School.*
MISS E. RAYMOND, - - - - - - - - *Fourth School.*
MISS I. HILL, - - - - - - - - - *Primary School.*
MISS ORRIE NETTLETON, - - - - - *Russell School.*
MISS M. E. ROBINSON, - - - - - - *Cooking School.*

SEWING DEPARTMENT.

MISS E. WHITTEMORE.

PAPER BOX DEPARTMENT.

C. W. ATTENBOROUGH, MRS. C. W. TAGGART.

J. C. FORD, - - - - - - - - *Machinery and Repairs.*
R. JONES, - - - - - - - - - - *Watchman.*
C. W. TAGGART, - - - - - - - - - *Engineer.*
F. A. HALEY, - - - - - - - - *Assistant Engineer.*

FARM AND GARDEN.

D. T. COATES, - - - - - - - - - - *Farmer.*

STATEMENT RESPECTING

—THE—

Connecticut Industrial School for Girls.

LOCATION.

Its location is at Middletown, on the line of the Connecticut Valley, the Air Line, and the Middletown branch of the Hartford and New Haven Railroad. Communications relating to it should be addressed to the Superintendent at the School.

PROPER SUBJECTS.

The proper subjects are not *merely* paupers, nor orphans, nor confirmed thieves, nor prostitutes, nor other criminals, but *viciously inclined girls between the ages of 8 and 16 years.*

The class includes:

1. The stubborn and unruly, who refuse to obey those who have the proper charge of them.
2. Truants, vagrants, and beggars.
3. Those found in circumstances of manifest danger of falling into habits of vice and immorality.
4. Those who have committed any offense punishable by fine or imprisonment, or both, other than imprisonment for life.

The Official Report to the General Assembly, made in 1867, shows that there are from 300 to 500 in the State.

PECULIAR FEATURES.

1. It is *not a State institution, but a private charity*, incorporated and employed by the State for the custody, guardianship, discipline, and instruction of the aforenamed girls. The State, as the common parent and guardian of the community, treats them as minors and wards.

The School was founded by private charity, and is under the control of a self-perpetuating Board of Directors, originally chosen by the donors to its funds, together with three *ex-officio* State Officers.

For each girl committed to it by legal process, the State pays two dollars and seventy-five cents a week.

2. *Its design* is not that of a prison to which criminals are consigned for punishment, but that of a temporary place of custody and instruction. Its object is prevention and reformation, by giving to the children that special physical, mental, moral, social, and industrial training necessary to fit them for life, and which they cannot receive elsewhere, except in very rare cases. And *just so soon* as this is accomplished, and they can be placed in suitable circumstances elsewhere, their connection with the School ceases.

(See Report of the Commissioners of Inquiry to the General Assembly of 1867, and the Second Report of the School.)

The Supreme Court of Pennsylvania gave the following decision at the December term, 1828, as the unanimous opinion of the Court in full, consisting of Chief Justice Gibson and four Assistant Judges:

"*Per curiam*. The House of Refuge is not a prison, but a school where reformation, and not punishment, is the end. It may, indeed, be used as a prison for juvenile convicts, who would else be committed to a common jail; and in respect to these, the constitutionality of the act which incorporated it stands clear of controversy. It is only in respect of the application of its discipline to subjects admitted on the order of a court, a magistrate, *or the managers of the Almshouse*, that a doubt is entertained. The object of the charity is reformation, by training its inmates to industry, imbuing their minds with principles of morality and religion, by furnishing them with the means to earn a living, and, above all, by separating them from the corrupting influence of improper associates. To this end, may not the natural parents, *when unequal to the task of education, or unworthy of it*, be superseded by the *parens patriæ*, or common guardians of the community?

"It is to be remembered that the public has a paramount interest in the virtue and knowiedge of its members, and that of strict right the business of education belongs to it. The parents are ordinarily entrusted with it because it can seldom be put into better hands; but *when they are incompetent or corrupt*, what is there to prevent the public from withdrawing the facilities, held, as they obviously are, at its sufferance?

"As to an abridgement of indefeasible rights by confinement of the person, it is no more than what is borne to a greater or less extent in every school, and we know of no natural right to exemption from restraints which conduce to an infant's welfare, nor is there a doubt of their application in this particular case.

The infant has been snatched from a course which must have ended in confirmed depravity; *and not only is the restraint lawful, but it would* be an act of extreme cruelty to release her from it."

A similar decision was made by the Supreme Court of Baltimore City in 1868, in which the decision of the Pennsylvania Court is quoted and endorsed in full.

3. *The form of Committal* is by a civil rather than a criminal process. Parents, guardians, selectmen, grand jurors, or *any proper officers* of the town where the girl is found, may present a written complaint to a Judge of Probate, or of the criminal or police court of any city or borough *sitting in chambers*, or to any Justice of the Peace of the town where the girl is found, who must thereupon take cognizance and determine the case.

The form of Commitment reads: "To the guardianship and control of the institution till she is 21, unless sooner discharged according to law." Any two of the Directors may discharge a girl for sufficient reasons, or bind her to service, still retaining the right of control prescribed by law.

4. *The system of discipline and education* is specially adapted to the conditions and wants of the girls. It aims to be as nearly as possible that of a well-regulated Christian family. Its culture is physical, sanitary, educational, industrial, and truly Christian, but not sectarian.

5. *Its History.* It was incorporated in 1868, received its first inmates January, 1870, was formally opened the 30th of June following, and two Homes were occupied in October.

6. *Its present condition* is in the highest degree prosperous and encouraging. It has a beautifully located, well cultivated and stocked farm, six Family Houses, designed for 220 inmates. It has a school building containing four rooms and a chapel hall, a box factory, a Superintendent's and Farmer's house, two barns, and other valuable buildings. It has a full and well-organized board of teachers and officers. One hundred and thirty-six different towns in the State have committed girls to its care. The discipline has generally proved salutary and successful.

Other particulars are given in the present and previous reports.

List of Directors of the School

SINCE ITS ORGANIZATION.

DIRECTORS.

Names.		Terms of Service.		
T. M. Allyn,	Hartford,	Elected,	1868.	Died in office, 1882.
Charles Fabrique,	New Haven,	"	1868.	Died in office, 1889.
E. W. Hatch,	Meriden,	"	1868.	Died in office, 1874.
H. D. Smith,	Plantsville,	"	1868.	Still in office.
George Beach,	Hartford,	"	1868.	Retired in 1877.
T. K. Fessenden,	Farmington,	"	1868.	Retired in 1883.
James E. English,	New Haven,	"	1869.	Retired in 1884.
Samuel C. Hubbard,	Middletown,	"	1869.	Retired in 1878.
Samuel Babcock,	Middletown,	"	1869.	Retired in 1872.
Samuel Russell,	Middletown,	"	1872.	Retired in 1881.
O. Vincent Coffin,	Middletown,	"	1873.	Retired in 1874.
John M. Van Vleck,	Middletown,	"	1873.	Still in office.
Frederic Gardiner,	Middletown,	"	1874.	Retired in 1883.
Charles F. Browning,	Middletown,	"	1875.	Died in office, 1894.
E. K. Hunt,	Hartford,	"	1877.	Retired in 1884.
W. W. Wilcox,	Middletown,	"	1878.	Retired in 1884.
J. W. Alsop,	Middletown,	"	1881.	Died in office, 1891.
John C. Parsons,	Hartford,	"	1882.	Retired in 1884.
Clarence E. Bacon,	Middletown,	"	1883.	Still in office.
J. P. Barstow,	Norwich,	"	1883.	Died in office, 1893.
Lorrin A. Cooke,	Barkhamsted,	"	1884.	Still in office.
A. C. Denison,	Middlefield,	"	1884.	Died in office, 1890.
Edward Payne,	Middletown,	"	1884.	Still in office.
Rodney Dennis,	Hartford,	"	1884.	Still in office.
S. E. Merwin,	New Haven,	"	1890.	Retired in 1894.
Morris W. Seymour,	Bridgeport,	"	1890.	Still in office.
Stephen O. Bowen,	Eastford,	"	1890.	Still in office.
Samuel Russell,	Middletown,	"	1891.	Still in office.
Loren A. Gallup,	Norwich,	"	1893.	Still in office.
Wm. H. Burrows,	Middletown,	"	1894.	Still in office.

SUPERINTENDENTS.

James H. Bradford, - - - - - -	Appointed	Sept. 3, 1869.
James H. Eastman *(pro tem.)*, - - - -	"	Sept. 2, 1873.
S. N. Rockwell, - - - - - -	"	Mar. 4, 1874.
Mary E. Rockwell *(Assistant)*, - - - -	"	Mar. 4, 1874.
Charles H. Bond, - - - - - -	"	Dec. 5, 1877.
Lydia M. Bond *(Assistant)*, - - - - -	"	Dec. 5, 1877.
William G. Fairbank, - - - - -	"	Sept. 6, 1886.
Margaret E. Fairbank *(Assistant)*, - - -	"	Sept. 6, 1886.

DIRECTORS' REPORT.

To the Honorable the General Assembly of the State of Connecticut, January Session, 1895:

The Board of Directors respectfully present their Twenty-fourth and Twenty-fifth Annual Reports:

Number of girls in the School, October 1, 1892,	237
Number received during the last two years,	235
Whole number under care during the last two years,	472
Number placed out during the last two years,	236
Present number, October 1, 1894,	236
Whole number received since the opening of the School, January 1, 1870,	1,150
Whole number placed out,*	1,869
Number of towns from which girls are sent,	136

This is the twenty-fifth anniversary of the founding of the Connecticut Industrial School for Girls. It was among the first schools of the kind organized in the United States. The first years of its life were years of great anxiety and perplexity, until by continued trial and persistent hard work, a plan was wrought out by which to successfully conduct an Industrial School. From that time onward the School has made steady and commendable progress.

Any close observer of the School from its inception, will be constrained to say, that we never closed a year with greater encouragement and hopefulness for the future of the Industrial School than we do this day.

The appropriation made by the last Legislature, has enabled us to make such additions to the Russell Home and to Fessenden Hall, as will enable the Superintendent and his assistants to do their best work.

We have also obtained from the City of Middletown the privilege of conveying the sewage of the Homes into one of the city mains, and by this means the sanitary condition of the Institution is greatly improved.

The addition to Fessenden Hall gives the much needed room for our library, and an enlarged and greatly improved

* These figures include girls who have been dismissed and received several times.

assembly-room for the daily use of the School. This addition also provides a school-room for the Primary Department, nearer the Browning Home, with a desirable isolation from the other schools.

These improvements completed, give to our plant—in its buildings, in its school-rooms, and its hygiene—a position second to no school of the kind of which we have knowledge.

There is a department of the School taught in the Russell Home, and, for prudential reasons, this department is exclusively for the girls living in the Home.

The school-room in Fessenden Hall, also, for the same reasons, is for the younger children living in the Browning Home.

Thus, as by Report of our Acting School Visitor, we have five departments of our graded school, and we think, all that is desirable in school-rooms and their location.

The Girls' Industrial School is a child-saving organization. It aims directly to accomplish its object by the means of appropriate instruction, by suitable employment on the premises, and then, as early as is feasible, by placing the girls in families, where at once they become self-supporting.

Our girls are trained to become good housekeepers, because it is the best employment the world has ever found for woman's self-support. What our girls most need when they go out from the School is a good home and useful employment. They are very likely to obtain both these, and good wages also, if they are good housekeepers. A young woman in the common walks of life, without a knowledge of housekeeping, is scarcely fitted for marriage, and knows little of the best methods to make a pleasant and happy home. A good housekeeper has her choice of employment in the best families in the community where she lives. It is really the only industry known among us for which the demand is always greater than the supply.

The general features of the School which relate to instruction, discipline and domestic arrangements, are substantially the same as at first, and yet in each department better work is done as each year goes by. An improvement worthy of remark has been made in the discipline of the School, as will be seen in the fact that obedience is secured without resort to corporal punishment. In the last five years there has

been no recourse to this mode of punishment, and a better obedience is secured, and a kindlier spirit begotten by a wise application of the great law of kindness.

Most of the girls are very illiterate when they first come to us, a condition that shows the great need of the law of compulsory education, and the necessity of its enforcement with thoroughness and in careful detail.

The short time the girls are in the School makes it highly obligatory with us to employ the best teachers, both to instruct the girls and inspire them with the best and highest purposes of life.

It is a matter of great practical importance to the State and to the benefactors of the School, to obtain an accurate knowledge of what is really accomplished for the girls who are educated and trained in the Industrial School.

To answer this inquiry a record or biography is kept of each girl who comes to us, from the time she enters the School until she is twenty-one years of age. This record shows a true history of each girl's life. It is kept by the Visiting Agent, who is conversant with the life and conduct of each girl, both in the School and after they are placed out in families. It is with no ordinary pleasure and gratitude to God, that we are enabled to report that more than ninety per cent. of all the girls placed out from the School for the last eight years, are to-day supporting themselves and leading lives of usefulness and respectability.

The principal cause that brings girls to the Industrial School is the lack of good homes and proper training.

The best place in all the world for the education and training of children is a good Christian home. In the light of this truth the founders of this Institution organized it on the family plan, in preference to the congregate. These homes were built each to accommodate such number of inmates as a matron and her assistants can care for and educate in the duties and amenities of a well-ordered family.

These buildings are furnished with the influences and surroundings of Christian homes; and the better we succeed in doing this part of our work, the greater will be the success of the School.

New England homes, mostly for many generations of the past, have been emphatically Christian. A father's wisdom

and a mother's love together have made home the brightest spot on earth for children; so the best product of New England for generations has been men and women who have honored their birth-place and blessed the world.

We make the Homes here Christian after the New England model, by teaching obedience, righteousness, industry, honor, purity, love, the great virtues that adorn and ennoble character.

When an Industrial School like ours has for a quarter of a century received wayward, homeless girls, and so educated and developed their better natures, that nine-tenths of them become self-supporting, industrious and respectable citizens, it should be accredited with having done some of the best work in human life.

For particulars in regard to the progress of the girls in their school studies we refer to the report of the Acting School Visitor.

For details of the conduct and success of the girls placed out in families, we call attention to the report of the Visiting Agent.

For information in regard to the farm, the erection of buildings, repairs and additions to same, and matters of general interest to the State and friends of the School, reference is made to the report of the Superintendent.

We all recognize the efficient and valuable work accomplished year by year by the united labors of the Superintendent and his wife, and we feel it due to them to say, that the Institution was never better managed, and never in better condition than we find it to-day.

HENRY D. SMITH,
JOHN M. VAN VLECK,
CLARENCE E. BACON,
LORRIN A. COOKE,
EDWARD PAYNE,
RODNEY DENNIS,
MORRIS W. SEYMOUR,
STEPHEN O. BOWEN,
SAMUEL RUSSELL,
LOREN A. GALLUP,
WILLIAM H. BURROWS.

SUPERINTENDENT'S REPORT.

To the Directors of the Connecticut Industrial School for Girls:

GENTLEMEN:—The Twenty-fourth Annual Report of this Institution is herewith respectfully submitted.

The following tables include the statistics for the past twelve months and for the previous years of the School:

TABLE I.

NUMBER FROM THE BEGINNING.

Girls received since January 1, 1870,		1,101
Dismissed,	1,763	
Of these were returned,	885	
Remaining out,		878
Number in School October 1, 1893,		223

TABLE II.

NUMBER DURING PAST YEAR.

In School October 1, 1892,	237	
Received during the year,	116	
Whole number under care during year,		353
Placed out during year,		130
Remaining October 1, 1893,		223

TABLE III.

NUMBERS RECEIVED EACH MONTH, INCLUDING BOTH COMMITMENTS AND RETURNS.

MONTH.	Past Year.	Previously.	Total.
October, 1892, - - - -	11	178	189
November, " - - - -	6	160	166
December, " - - - -	10	165	175
January, 1893, - - - -	12	161	173
February, " - - - -	6	155	161
March, " - - - -	13	131	144
April, " - - - -	7	143	150
May, " - - - -	7	138	145
June, " - - - -	9	138	147
July, " - - - -	15	151	166
August, " - - - -	9	171	180
September, " - - - -	11	185	196
Total, - - - - -	116	1,876	1,992

TABLE IV.

TOWNS FROM WHICH GIRLS WERE COMMITTED.

TOWNS.	Past Year.	Previously.	Total.
Andover, - - - - -	—	1	1
Avon, - - - - -	—	1	1
Ansonia, - - - - -	—	2	2
Barkhamsted, - - - -	—	5	5
Berlin, - - - - -	—	7	7
Bethel, - - - - -	—	3	3
Bozrah, - - - - -	—	1	1
Branford, - - - - -	1	7	8
Bridgeport, - - - -	10	62	72
Bridgewater, - - - -	—	1	1
Bristol, - - - - -	—	7	7
Brookfield, - - - - -	—	1	1
Brooklyn, - - - - -	—	6	6
Bethany, - - - - -	—	4	4
Burlington, - - - - -	—	5	5
Birmingham, - - - -	—	1	1
Canaan, - - - - -	—	1	1
Chatham, - - - - -	—	4	4
Cheshire, - - - - -	—	5	5
Chester, - - - - -	—	1	1
Clinton, - - - - -	—	2	2
Colchester, - - - - -	—	8	8
Cornwall, - - - - -	1	1	2
Coventry, - - - - -	—	1	1
Cromwell, - - - - -	—	2	2
Danbury, - - - - -	—	12	12
Darien, - - - - -	—	1	1
Carried forward, - - -	12	152	164

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	12	152	164
Derby,	—	11	11
Durham,	—	3	3
Danielsonville,	—	1	1
Easton,	—	1	1
Eastford,	1	5	6
East Hartford,	—	1	1
East Haven,	—	7	7
East Haddam,	1	1	2
East Lyme,	—	1	1
Enfield,	—	6	6
Essex,	—	5	5
Fairfield,	—	1	1
Farmington,	—	9	9
Glastonbury,	—	5	5
Granby,	—	3	3
Greenwich,	—	4	4
Griswold,	—	3	3
Groton,	—	3	3
Guilford,	—	3	3
Haddam,	—	8	8
Hadlyme,	—	1	1
Hartford,	4	157	161
Hebron,	—	2	2
Huntington,	1	8	9
Kent,	—	3	3
Killingly,	—	11	11
Killingworth,	—	2	2
Litchfield,	—	3	3
Lyme,	—	3	3
Manchester,	—	2	2
Meriden,	2	27	29
Middlebury,	—	2	2
Middletown,	—	22	22
Milford,	—	3	3
Monroe,	—	3	3
Montville,	—	7	7
Mystic,	—	1	1
Naugatuck,	—	3	3
New Britain,	—	22	22
New Haven,	11	232	243
New Canaan,	—	2	2
New London,	2	12	14
New Milford,	—	4	4
New Hartford,	—	5	5
Newtown,	—	7	7
Norfolk,	—	3	3
North Haven,	—	4	4
North Manchester,	—	2	2
North Stonington,	—	2	2
Newington,	—	1	1
Norwalk,	1	15	16
Norwich,	—	32	32
New Fairfield,	—	1	1
Old Lyme,	—	3	3
Carried forward,	35	840	875

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	35	840	875
Old Saybrook,	—	1	1
Orange,	—	5	5
Oxford,	—	6	6
Plainfield,	—	2	2
Plantsville,	—	2	2
Plymouth,	—	5	5
Portland,	—	1	1
Plainville,	—	2	2
Preston,	—	4	4
Putnam,	—	8	8
Pomfret,	—	2	2
Ridgefield,	—	5	5
Rockville,	1	1	2
South Britain,	—	1	1
Salisbury,	—	3	3
Saybrook,	—	5	5
Seymour,	—	2	2
Sharon,	—	7	7
Shelton,	—	1	1
Sherman,	—	1	1
Simsbury,	—	2	2
Southbury,	—	2	2
Southington,	—	9	9
Southport,	—	1	1
Stafford,	—	6	6
Stamford,	1	14	15
Stonington,	1	9	10
Stratford,	—	10	10
Sterling,	—	1	1
Thomaston,	—	2	2
Thompson,	—	3	3
Torrington,	2	1	3
Trumbull,	—	2	2
Tolland,	—	2	2
Vernon,	—	9	9
Wallingford,	—	8	8
Washington,	—	2	2
Waterbury,	2	27	29
Waterford,	—	1	1
Watertown,	—	3	3
Westbrook,	—	1	1
West Hartford,	—	1	1
Weston,	—	3	3
Westport,	—	2	2
Wethersfield,	—	4	4
Willimantic,	—	2	2
Wilton,	—	1	1
Winchester,	2	4	6
Windham,	—	8	8
Windsor,	—	1	1
Windsor Locks,	—	4	4
Woodbury,	1	6	7
Claremont, N. H.,	—	1	1
Total,	45	1,056	1,101

TABLE V.

AGES OF GIRLS COMMITTED.

AGES.	Past Year.	Previously.	Total.
Seven years (private boarder),	—	2	2
Eight "	—	57	57
Nine "	—	52	52
Ten "	1	62	63
Eleven "	2	101	103
Twelve "	6	134	140
Thirteen "	4	147	151
Fourteen "	11	220	231
Fifteen "	21	272	293
Sixteen "	—	3	3
Seventeen "	—	2	2
Eighteen "	—	1	1
Unknown,	—	3	3
Total,	45	1,056	1,101

TABLE VI.

NATIVITY OF GIRLS COMMITTED.

	Past Year.	Previously.	Total.
Connecticut,	32	793	825
Massachusetts,	4	34	38
Maine,	—	3	3
Rhode Island,	—	11	11
Vermont,	—	4	4
New Hampshire,	—	5	5
New York,	3	68	71
New Jersey,	—	9	9
Delaware.	—	1	1
Pennsylvania,	—	10	10
Maryland,	—	2	2
Virginia,	—	9	9
Tennessee,	—	2	2
Georgia,	—	1	1
Louisiana,	—	2	2
Ohio,	—	3	3
North Carolina,	—	4	4
South Carolina,	—	2	2
Illinois,	—	1	1
Iowa,	1	—	1
Missouri,	—	1	1
Canada,	—	9	9
District of Columbia,	1	4	5
England,	—	14	14
Ireland,	1	25	26
Italy,	—	2	2
Russia,	2	—	2
Scotland,	—	8	8
Wisconsin,	—	1	1
Germany,	—	8	8
Labrador,	—	1	1
Nova Scotia,	—	1	1
Switzerland,	—	2	2
Unknown,	1	16	17
Total,	45	1,056	1,101

TABLE VII.

PARENTAGE OF GIRLS COMMITTED.

PARENTS.	Past Year.	Previously.	Total.
American, white,	15	462	477
American, colored,	5	142	147
American and French,	—	4	4
American and English,	1	8	9
American and German,	1	5	6
American and Irish,	3	41	44
American and Indian,	—	1	1
American and Italian,	—	1	1
American and Swiss,	—	1	1
English,	3	29	32
English and Irish,	—	10	10
English and German,	1	1	2
English and Scotch,	—	1	1
French,	2	7	9
French Canadian,	—	12	12
French and German,	—	1	1
German,	3	44	47
German and Irish,	—	2	2
German and Spanish,	—	1	1
Irish,	4	247	251
Irish and Canadian,	—	1	1
Italian,	—	4	4
Jew,	2	1	3
Scotch,	—	13	13
Scotch and Irish,	—	3	3
Scotch and Canadian,	—	1	1
Swiss,	—	2	2
Unknown,	5	11	16
Total,	45	1,056	1,101

TABLE VIII.

NUMBER DISMISSED EACH MONTH.

MONTH.	Past Year.	Previously.	Total.
October, 1892,	10	141	151
November, "	10	128	138
December, "	10	105	115
January, 1893,	9	120	129
February, "	12	86	98
March, "	15	161	176
April, "	10	137	147
May, "	16	131	147
June, "	11	125	136
July, "	8	151	159
August, "	7	174	181
September, "	12	174	186
Total,	130	1,633	1,763

TABLE IX.

CAUSE OF DISMISSAL.

CAUSE.	Past Year.	Previously.	Total.
Expiration of minority,	3	54	57
Placed out in families,	85	1,175	1,260
Placed out with relatives,	33	311	344
Found unfit subjects,	—	32	32
Ordered to new trial,	2	4	6
Escaped,	1	4	5
Death,	—	24	24
Placed in hospital,	6	21	27
Remain as assistants,	—	8	8
Total,	130	1,633	1,763

TIME TABLE.

From April 15th to October 15th, Kitchen Girls rise at	5:00	o'clock A. M.
Rising Bell,	5:30	" "
Officers' and Girls' Breakfast,	6:00	" "
Prayers,	6:25	" "
Sweeping, hall work, making beds, etc.,	6:40	" "
Work (all departments),	7:00	" "
Recess,	9:15	" "
Work,	9:30	" "
Recess,	11:45	" "
Dinner,	12:00	" M.
Recess,	12:30	" P. M.
Dressing Bell,	1:00	" "
Line for School,	1:20	" "
Recess,	3:25	" "
School Closes,	5:40	" "
Recess,	5:40	" "
Supper,	6:00	" "
Recess,	6:25	" "
Pass to Chapel for Prayers,	7:10	" "

From October 15th to April 15th, the Bell for Rising and Breakfast will ring a half-hour later than the above.

ACCOUNT OF EXPENDITURES.

From October 1st, 1892, to October 1st, 1893.

Salaries and Wages,		$10,202 61
Furniture and Fixtures,		614 70
Fuel and Lights,		3,770 65
Dry Goods and Clothing,		3,341 01
Books, Stationery, and Postage,		679 47
Provisions and Groceries,		4,924 16
Fish and Meat,		2,425 67
Flour and Meal,		2,008 95
Farm and Garden,		3,647 31
Construction and Repairs,		3,464 41
Drugs, Medicines, and Medical Attendance,		451 22
Miscellaneous,		2,469 98
Paper Box Factory,		6,112 33
		$44,112 47
Cash on hand October 1, 1892,		43 89
		$44,068 58
Cash on hand October 1, 1893,		6 47
		$44,075 05

MIDDLETOWN, CONN., January 23, 1894.

We hereby certify that we have examined the accounts of William G. Fairbank, Superintendent of the Connecticut Industrial School for Girls for the fiscal year ending September 30, 1893, compared them with the vouchers and found the same correct. The balance in the hands of the Superintendent on September 30, 1893, was six dollars and forty-seven cents ($6.47). There was also due the Institution on said date the sum of five hundred and thirty-five dollars and eighty-eight cents ($535.88), for work and material from the box shop.

E. LIVINGSTON WELLS, } *Auditors of*
OSCAR LEACH, } *Public Accounts.*

PAPER BOX FACTORY.

IN ACCOUNT WITH CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Debtor.

To stock on hand October 1, 1892,	$1,233 00	
To bills and salaries paid from October 1, 1892, to October 1, 1893,	6,112 33	
Net earnings,	2,063 71	
		$9,409 04

Credit.

By receipts from sale of boxes from October 1, 1892, to October 1, 1893,	$7,330 94	
Finished work October 1, 1893,	656 04	
Stock on hand October 1, 1893,	1,422 05	
		$9,409 04

DONATIONS.

October, *1892*.—Murray Closson, city, 12 copies Youth's Palladium.

November, *1892*.—Murray Closson, city, 12 copies Youth's Palladium.

December, *1892*.—H. C. Ward, city, lot of calendars and lead pencils.
Colchester Rubber Co., Colchester, 4 dozen toy rubber boots.
Gaston Hubbard, city, 3½ dozen Florida oranges.
Stoddard, Kimberly & Co., New Haven, $10.
D. L. Weeks & Son, city, 3 dozen china plates.
Mrs. W. H. Smith, New Britain, 3 needle books, 2 pictures, 1 handkerchief, 1 writing tablet, 6 paper dolls, 3 yards ruching, 1 sachet bag, 9 Christmas cards.
J. H. Bunce, city, 1 dozen cakes toilet soap, 1 dozen large pocketbooks, 7 celluloid tablets, 3 Christmas cards, 44 purses, 7 pin cushions, 1 dozen large bottles cologne, 29 paper weights, 4 perfumery bottles, 1 match safe, 12 towel holders, 5 baskets with perfumery.
H. Bernhard, city, 5 scrap-books, 1 basket, 3 ink wells, 6 cologne bottles, 10 yards ribbon, 1 autograph, 5 Christmas cards, 1 pin cushion, 2 pen-wipers.
Mrs. Frances Bacon, New Haven, 8 handkerchiefs.
Miss Susan Clarke, city, $10.
Coles & Weeks, city, $5.
Morgan Street Mission School, Hartford, 1 year's subscription to 6 copies Youth's Companion, 1 year's subscription to Household.

January, *1893*.—Murray Closson, city, 10 copies New Republic.
L. S. Deming, city, lot of Wide Awakes, lot of Youth's Companions, lot of Congregationalists.

May, *1893*.—Miss Spencer, Deep River, large box of papers and magazines.

July, *1893*.—Edward Payne, city, lot of papers.
E. H. Wells, city, 1 dozen ladies' waists.

August, *1893*.—A. G. McKee, city, 29 Japanese fans.

The following papers have been regularly sent to the School, free of charge: Daily Courant, Hartford; Weekly Times, Hartford; Sentinel and Witness, Middletown; Daily Penny Press, Middletown; Daily Herald, Middletown; Christian Secretary, Hartford; Temperance Banner; Good Health, Battle Creek, Mich.; The Howard Times, R. I.; The Summary, Elmira, N. Y.; Traveller's Record, Hartford; The Delaware County Advocate, Penn.; The Advance, Jamesburg, N. J.; Lyman School Enterprise, Westboro, Mass.; Industrial School Courier, Kearney, Neb.; The Budget, Farm School, Boston, Mass.; The Dawn, Meriden, Conn.

FARM REPORT.

Farm Products Furnished to School from October 1, 1892, to October 1, 1893.

Apples,	15	barrels,		$22 50
Apples (crab),	15	bushels,		9 00
Beans (shell),	14	bushels,		17 50
Beans (string),	30	bushels,		30 00
Butter,	1,893	pounds,		473 25
Blackberries,	122	quarts,		12 20
Barley,	10	tons,		150 00
Cherries,	6	quarts,		60
Corn (sweet),	100	bushels,		40 00
Corn Fodder,	7	tons,		105 00
Cucumbers,	5	bushels,		7 50
Cabbages,	4,500	heads,		270 00
Currants,	384	quarts,		38 40
Eggs,	678	dozen,		122 04
Grapes,	2½	bushels,		4 00
Gooseberries,	13	quarts,		1 30
Hay,	48	tons,		864 00
Lettuce,	200	dozen heads,		60 00
Melons,	1	ton,		20 00
Milk,	34,720	quarts,		1,388 80
Onions,	15	bushels,		11 25
Potatoes,	425	bushels,		276 25
Peas,	30	bushels,		30 00
Peaches,	2	bushels,		4 00
Pie Plant,	1,800	pounds,		54 00
Rye,	12	tons,		180 00
Raspberries (black),	207	quarts,		20 70
Raspberries (red),	592	quarts,		59 20
Strawberries,	225	quarts,		33 75
Squashes (summer),	175	dozen,		21 00
Squashes (winter),	1	ton,		25 00
Turnips,	100	bushels,		30 00
Tomatoes,	178	bushels,		106 80
Quinces,	2	bushels,		5 00
Celery,	2,500	heads,		62 50
Ice,	225	tons,		675 00

Meat Consumed.

Pork,	200 pounds,		$14 00
Beef,	550 pounds,		38 50
Chickens,	400 pounds,		60 00

Meat Sold.

Pork,	3,000 pounds,	$300 00

The Live Stock Consists of:

5 Horses,	$550 00
18 Cows,	810 00
17 Hogs,	345 00
36 Pigs,	72 00
60 Shoats,	240 00
250 Hens,	125 00
150 Chickens,	45 00

TREASURER'S ANNUAL REPORT.

From September 30th, 1892, to September 30th, 1893.

RECEIPTS.

By balance, September 30, 1892,	$252 56
By State bills for the twelve months,	37,355 62
By receipts from box business,	7,330 94
By sale of coal,	67 60
By farm and garden,	234 96
By dry goods sold,	22 63
By medicine sold,	1 80
By thread sold,	5 59
By barrels sold,	26 85
By discount on bills,	15 26
By use of telephone and telegrams,	3 15
By private board,	22 00
By use of scales,	2 00
By lemons sold,	25
By rags sold,	10 04
By J. Tendal, for hack,	1 50
	$45,352 75

EXPENDITURES.

Paid 400 orders of the Executive Committee,	$44,075 05
Balance, September 30, 1893,	$1,277 70

Respectfully submitted,

C. F. BROWNING, *Treasurer.*

We hereby certify that we have examined the accounts of Charles F. Browning, Treasurer of the Connecticut Industrial School for Girls, for the fiscal year ending September 30, 1893, compared them with the vouchers, and found the same correct. The balance in the hands of the Treasurer on September 30, 1893, was one thousand two hundred and seventy-seven dollars and seventy cents ($1,277.70).

E. LIVINGSTON WELLS, }
OSCAR LEACH, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., Jan. 23, 1894.

SUPERINTENDENT'S REPORT.

To the Directors of the Connecticut Industrial School for Girls:

GENTLEMEN:—I take pleasure in presenting to you my Annual Report for the fiscal year ending September 30, 1894.

The following tables include the statistics for the past twelve months and for the previous years of the School:

TABLE I.

NUMBER FROM THE BEGINNING.

Girls received since January 1, 1870,		1,150
Dismissed since January 1, 1870,	1,869	
Of these were returned,	955	
Remaining out,		914
Number in School October 1, 1894,		236

TABLE II.

NUMBER DURING PAST YEAR.

In School October 1, 1893,	223	
Received during the year,	119	
Whole number under care during year,		342
Placed out during year,		106
Remaining October 1, 1894,		236

TABLE III.

NUMBERS RECEIVED EACH MONTH, INCLUDING BOTH COMMITMENTS AND RETURNS.

MONTH.	Past Year.	Previously.	Total.
October, 1893,	11	189	200
November, "	11	166	177
December, "	6	175	181
January, 1894,	13	173	186
February, "	14	161	175
March, "	10	144	154
April, "	5	150	155
May, "	2	145	147
June, "	15	147	162
July, "	15	166	181
August, "	8	180	188
September, "	9	196	205
Total,	119	1,992	2,111

TABLE IV.

TOWNS FROM WHICH GIRLS WERE COMMITTED.

TOWNS.	Past Year.	Previously.	Total.
Andover,	—	1	1
Avon,	—	1	1
Ansonia,	—	2	2
Barkhamsted,	—	5	5
Beacon Falls,	1	—	1
Bethel,	1	3	4
Berlin,	—	7	7
Bozrah,	—	1	1
Branford,	—	8	8
Bridgeport,	4	72	76
Bridgewater,	—	1	1
Bristol,	1	7	8
Brookfield,	—	1	1
Brooklyn,	—	6	6
Bethany,	—	4	4
Burlington,	—	5	5
Birmingham,	—	1	1
Canaan,	—	1	1
Chatham,	2	4	6
Cheshire,	—	5	5
Chester,	—	1	1
Clinton,	—	2	2
Colchester,	—	8	8
Cornwall,	—	2	2
Coventry,	—	1	1
Cromwell,	—	2	2
Danbury,	—	12	12
Darien,	—	1	1
Derby,	—	11	11
Carried forward,	9	175	184

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	9	175	184
Durham,	—	3	3
Danielsonville,	—	1	1
Easton,	1	1	2
Eastford,	—	6	6
East Hartford,	—	1	1
East Haven,	—	7	7
East Haddam,	—	2	2
East Lyme,	—	1	1
Enfield,	—	6	6
Essex,	—	5	5
Fairfield,	—	1	1
Farmington,	—	9	9
Glastonbury,	1	5	6
Granby,	—	3	3
Greenwich,	—	4	4
Griswold,	—	3	3
Groton,	—	3	3
Guilford,	—	3	3
Haddam,	—	8	8
Hadlyme,	—	1	1
Hartford,	9	161	170
Hebron,	—	2	2
Huntington,	—	9	9
Kent,	—	3	3
Killingly,	2	11	13
Killingworth,	—	2	2
Litchfield,	—	3	3
Lyme,	—	3	3
Manchester,	—	2	2
Meriden,	4	29	33
Middlebury,	—	2	2
Middletown,	1	22	23
Milford,	—	3	3
Monroe,	—	3	3
Montville,	—	7	7
Mystic,	—	1	1
Naugatuck,	—	3	3
New Britain,	2	22	24
New Haven,	9	243	252
New Canaan,	—	2	2
New London,	—	14	14
New Milford,	1	4	5
New Hartford,	—	5	5
Newtown,	—	7	7
Norfolk,	—	3	3
North Haven,	—	4	4
North Manchester,	—	2	2
North Stonington,	—	2	2
Newington,	—	1	1
Norwalk,	—	16	16
Norwich,	1	32	33
New Fairfield,	—	1	1
Old Lyme,	—	3	3
Old Saybrook,	1	1	2
Carried forward,	41	876	917

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	41	876	917
Orange,	—	5	5
Oxford,	—	6	6
Plainfield,	—	2	2
Plantsville,	—	2	2
Plymouth,	—	5	5
Portland,	—	1	1
Plainville,	—	2	2
Preston,	—	4	4
Putnam,	—	8	8
Pomfret,	1	2	3
Ridgefield,	—	5	5
Rockville,	1	2	3
Redding,	1	—	1
South Britain,	—	1	1
Salisbury,	—	3	3
Saybrook,	—	5	5
Seymour,	—	2	2
Sharon,	—	7	7
Shelton,	—	1	1
Sherman,	1	1	2
Simsbury,	—	2	2
Southbury,	—	2	2
Southington,	—	9	9
Southport,	—	1	1
Stafford,	—	6	6
Stamford,	1	15	16
Stonington,	—	10	10
Stratford,	—	10	10
Sterling,	—	1	1
Thomaston,	—	2	2
Thompson,	1	3	4
Torrington,	—	3	3
Trumbull,	—	2	2
Tolland,	—	2	2
Vernon,	—	9	9
Wallingford,	—	8	8
Washington,	1	2	3
Waterbury,	—	29	29
Waterford,	—	1	1
Watertown,	—	3	3
Westbrook,	—	1	1
West Hartford,	—	1	1
Weston,	—	3	3
Westport,	—	2	2
Wethersfield,	1	4	5
Willimantic,	—	2	2
Wilton,	—	1	1
Winchester,	—	6	6
Windham,	—	8	8
Windsor,	—	1	1
Windsor Locks,	—	4	4
Woodbury,	—	7	7
Claremont, N. H.,	—	1	1
Total,	49	1,101	1,150

TABLE V.

AGES OF GIRLS COMMITTED.

AGES.	Past Year.	Previously.	Total.
Seven years (private boarder), -	—	2	2
Eight " - - - -	—	57	57
Nine " - - - -	4	52	56
Ten " - - - -	2	63	65
Eleven " - - - -	5	103	108
Twelve " - - - -	8	140	148
Thirteen " - - - -	10	151	161
Fourteen " - - - -	10	231	241
Fifteen " - - - -	10	293	303
Sixteen " - - - -	—	3	3
Seventeen " - - - -	—	2	2
Eighteen " - - - -	—	1	1
Unknown, - - - - -	—	3	3
Total, - - - - -	49	1,101	1,150

TABLE VI.

NATIVITY OF GIRLS COMMITTED.

	Past Year.	Previously.	Total.
Connecticut, - - - -	36	825	861
Massachusetts, - - - -	2	38	40
Maine, - - - - -	—	3	3
Rhode Island, - - - -	1	11	12
Vermont, - - - - -	1	4	5
New Hampshire, - - -	—	5	5
New York, - - - -	3	71	74
New Jersey, - - - -	—	9	9
Delaware, - - - - -	—	1	1
Pennsylvania, - - - -	—	10	10
Maryland, - - - - -	1	2	3
Virginia, - - - - -	—	9	9
Tennessee, - - - - -	—	2	2
Georgia, - - - - -	—	1	1
Louisiana, - - - - -	—	2	2
Ohio, - - - - - -	—	3	3
North Carolina, - - - -	1	4	5
South Carolina, - - - -	—	2	2
Illinois, - - - - -	—	1	1
Iowa, - - - - - -	—	1	1
Missouri, - - - - -	—	1	1
Canada, - - - - -	—	9	9
District of Columbia, - - -	—	5	5
England, - - - - -	—	14	14
Ireland, - - - - -	1	26	27
Italy, - - - - - -	—	2	2
Russia, - - - - -	—	2	2
Scotland, - - - - -	—	8	8
Wisconsin, - - - - -	—	1	1
Germany, - - - - -	1	8	9
Labrador, - - - - -	—	1	1
Nova Scotia, - - - -	—	1	1
Switzerland, - - - -	—	2	2
Unknown, - - - - -	2	17	19
Total, - - - - -	49	1,101	1,150

TABLE VII.

PARENTAGE OF GIRLS COMMITTED.

PARENTS.	Past Year.	Previously.	Total.
American, white,	20	477	497
American, colored,	8	147	155
American and French,	—	4	4
American and English,	—	9	9
American and German,	3	6	9
American and Irish,	—	44	44
American and Indian,	—	1	1
American and Italian,	—	1	1
American and Swiss,	—	1	1
American and Canadian,	1	—	1
English,	—	32	32
English and Irish,	—	10	10
English and German,	—	2	2
English and Scotch,	—	1	1
French,	—	9	9
French Canadian,	—	12	12
French and German,	—	1	1
German,	3	47	50
German and Irish,	—	2	2
German and Spanish,	—	1	1
German and Swiss,	1	—	1
Irish,	8	251	259
Irish and Canadian,	—	1	1
Italian,	—	4	4
Jew,	—	3	3
Scotch,	—	13	13
Scotch and Irish,	—	3	3
Scotch and Canadian,	—	1	1
Swiss,	—	2	2
Unknown,	5	16	21
Total,	49	1,101	1,150

TABLE VIII.

NUMBER DISMISSED EACH MONTH.

MONTH.	Past Year.	Previously.	Total.
October, 1893,	9	151	160
November, "	9	138	147
December, "	7	115	122
January, 1894,	2	129	131
February, "	11	98	109
March, "	8	176	184
April, "	6	147	153
May, "	5	147	152
June, "	8	136	144
July, "	11	159	170
August, "	16	181	197
September, "	14	186	200
Total,	106	1,763	1,869

TABLE IX.

CAUSE OF DISMISSAL.

CAUSE.	Past Year.	Previously.	Total.
Expiration of minority,	6	57	63
Placed out in families,	62	1,260	1,322
Placed out with relatives,	31	344	375
Found unfit subjects,	—	32	32
Ordered to new trial,	1	6	7
Escaped,	—	5	5
Death,	1	24	25
Placed in hospital,	5	27	32
Remain as assistants,	—	8	8
Total,	106	1,763	1,869

TIME TABLE.

From April 15th to October 15th, Kitchen Girls rise at	5:00	o'clock A. M.
Rising Bell,	5:30	" "
Officers' and Girls' Breakfast,	6:00	" "
Prayers,	6:25	" "
Sweeping, hall work, making beds, etc.,	6:40	" "
Work (all departments),	7:00	" "
Recess,	9:15	" "
Work,	9:30	" "
Recess,	11:45	" "
Dinner,	12:00	" M.
Recess,	12:30	" P. M.
Dressing Bell,	1:00	" "
Line for School,	1:20	" "
Recess,	3:25	" "
School Closes,	5:40	" "
Recess,	5:40	" "
Supper,	6:00	" "
Recess,	6:25	" "
Pass to Chapel for Prayers,	7:10	" "

From October 15th to April 15th, the Bell for Rising and Breakfast will ring a half-hour later than the above.

ACCOUNT OF EXPENDITURES.

From October 1st, 1893, to October 1st, 1894.

Salaries and Wages,	$11,192 03
Furniture and Fixtures,	1,685 53
Fuel and Lights,	5,669 93
Dry Goods and Clothing,	2,210 29
Books, Stationery, and Postage,	473 52
Provisions and Groceries,	4,790 86
Fish and Meat,	2,197 87
Flour and Meal,	654 10
Farm and Garden,	3,889 90
Construction and Repairs,	10,131 69
Drugs, Medicines, and Medical Attendance,	441 53
Miscellaneous,	2,086 76
Paper Box Factory,	3,512 45
	$48,936 46
Cash on hand October 1, 1893,	6 47
	$48,929 99
Cash on hand October 1, 1894,	3 42
	$48,933 41

MIDDLETOWN, CONN., December 28, 1894.

We hereby certify that we have examined the accounts of William G. Fairbank, Superintendent of the Connecticut Industrial School for Girls, for the fiscal year ending September 30, 1894, compared them with the vouchers and found the same correct. The balance in the hands of the Superintendent on September 30, 1894, was three dollars and forty-two cents ($3.42). There was also due the School on said date the sum of one hundred and sixty-five dollars and seventy-eight cents ($165.78), for work and material from the box shop.

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

SPECIAL APPROPRIATION.

The Legislature of 1893 gave to the School a special appropriation of $18,000.00, for the following purposes:—

1. To lay a sewer connecting the sewerage of the School with that of the City of Middletown.

2. To build an additional wing to the Russell Home.

3. To build an addition to the Fessenden School building, and also to improve and repair the same.

The following table shows the amounts paid for each:

Sewer,	$2,203 35
Addition to Fessenden School building,	6,989 61
Russell wing,	8,807 04
Total,	$18,000 00

ACCOUNT OF EXPENDITURES.

From October 1st, 1893, to October 1st, 1894.

Salaries and Wages,	$11,192 03
Furniture and Fixtures,	1,685 53
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	$48,936 46
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Cash on hand October 1, 1894,	3 42
	$48,933 41

PAPER BOX FACTORY.

IN ACCOUNT WITH CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Debtor.

To stock on hand October 1, 1893,	$1,422 05	
To bills and salaries paid from October 1, 1893, to October 1, 1894,	3,512 45	
Net earnings,	2,949 59	
		$7,884 09

Credit.

By receipts from sale of boxes from October 1, 1893, to October 1, 1894,	$6,989 04	
Finished work October 1, 1894,	111 93	
Stock on hand October 1, 1894,	630 01	
Freight bill prepaid,	153 11	
		$7,884 09

Special Appropriation.

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1. To lay a sewer connecting the sewerage of the School with that of the City of Middletown.

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The following table shows the amounts paid for each:

Sewer,	$2,203 35
Addition to Fessenden School building,	6,989 61
Russell wing,	8,807 04
Total,	$18,000 00

We hereby certify that we have examined the above accounts of the special appropriation of 1893, compared them with the vouchers, and found the same correct.

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., December 28th, 1894.

The two years ending September 30, 1894, have been years of blessing and prosperity. But one death has occurred—Minnie Lake died July 29, 1894, of dysentery. We have had little severe sickness. Our sanitary condition is excellent. We believe it will bear critical examination.

The discipline was never better, at least we may affirm this, of the time since our connection with the School.

In every department commendable progress has been made, and our desire is, that the future may find us accomplishing all that it is possible, for our girls. Through the generous provisions made by the last Legislature, which gave us a special appropriation of $18,000, we have erected a wing to the Russell Home and an addition to the Fessenden School building.

We have also laid a sewer, connecting the sewerage system of our School with that of the City of Middletown. This will dispose of our sewage in a most satisfactory and perfect manner, and dispel the ever-present anxiety we have had, lest some epidemic fastening upon us, might find in our imperfect sewerage, fruitful cause for its most fatal ravages.

The Russell wing provides rooms for thirty-four girls.

For some time we have been in most pressing need of more room, as at times we have been forced to use our hospital rooms as regular sleeping apartments. It does not anticipate a future, but supplies a present need. Fessenden Hall, which is used for our daily devotional exercises, our Sabbath school, and many other meetings, needed enlargement. We were also in want of a library-room, a store-room for flour, etc., an additional school-room, and a dining-room connected with our cooking department. It was also desirable that a large room for recreation be provided, that might also be used as a gymnasium. All these are supplied by the addition made to the Fessenden School building. The new school-room not only lessens the number of scholars in each department, but adds another or fifth grade to the schools, which is a most happy change for the better. Of the schools, my son, as School Visitor, will report in detail.

We trust in the near future another Home may be given to the School. We shall then consider our Institution most thoroughly equipped for the work it has to accomplish for those committed to its care.

We did not ask the Legislature to appropriate funds for this Home, as we trust private munificence will supply the need. We wish to give to this Home the name of Honor Home, and in it we wish to place those girls, who by improvement and good conduct with us, are nearing the time when they may be placed out, or allowed to return to their own homes.

In this Home we should be able to introduce a mode of discipline and teaching, which would more perfectly develop those true and womanly qualities, habits and manners, which cannot be developed as well where many of the girls have not as yet come to appreciate their importance or earnestly to desire to acquire them. We classify our girls by sending them, when received, to the Home into which we believe from what we can learn of their history, they should be placed.

After further acquaintance, if we conclude it to be for their advantage or the advantage of others, that they be placed in another Home, we make the transfer.

Except at the time for devotional exercises, or when we bring them together on special occasions and when attending chapel services on the Sabbath, the girls of the different Homes do not mingle together.

At the times mentioned when meeting together, they are accompanied by the matrons and teachers of their respective Homes while going to and from such places of meeting, as well as while assembled together.

The same is also true of them as they attend school from day to day. They walk together as Homes until they arrive at the school building, when each girl enters the school in which she grades. A recess is had during the session, of fifteen minutes, in the school-rooms and halls, (not out of doors), all the teachers being present with them, to note their conduct and conversation.

The girls of the Russell Home do not attend school with the other girls, as they have a school by themselves in their Home building.

I have been thus explicit, lest the impression might prevail that no proper classification can be, or is made, in our School, and that little innocent girls are here placed where they will be "subject to the unhappy companionship of petty thieves, liars, and girls of unclean speech."

I only ask those whose duty it is to know, to visit our School for one day, one week, or one month (the longer the time the better), until they are qualified by a personal knowledge to determine for themselves, whether or no, we have a careful classification of our girls. Simple affirmation or denial carries conviction in proportion to an acquaintance with, or confidence in, the person making such statement. But earnest, careful, and candid inspection, which we solicit, will prove or disprove our statement. When we affirm that the youngest and most innocent girls of our School are less in the companionship of older and evil-minded girls of unclean speech, than are the girls who attend the public schools of our State, for to them, children of both sexes go and return unattended by either parents or teacher, often meeting by the way, the worst companions, hearing and seeing things contaminating, much oftener, *I repeat it*, *positively much oftener*, than is possible to be true in the experience of our girls.

I believe that every citizen who observes, knows this must be so, from the very nature of the case. Here, our girls are attended at all times by a matron or teacher, whose eyes and ears are on the alert to detect anything evil.

If it be said, girls going from this School speak of hearing and seeing evil things. If so, such things are not common, save in the Home where such girls are graded together, and there it is done, if at all, in a corner, driven out of the sight and hearing of the whole. But we may also ask, where is the boy or girl that attends our public schools who can not tell of hearing more profanity and vulgarity at school, or on the way to and from school, than it would be possible for a girl of one of our Homes to relate?

Concerning the girls that are still members of our School, who have been allowed to return to their homes, or have been placed in homes found for them with stranger families, the Visiting Agent will report.

I wish to acknowledge with sincere appreciation, the willing and efficient services rendered by my associate officers.

Although the past two years have been years of blessing, yet never in the history of our School has it in so short a time, been bereft of three of those whose lives have been so

closely identified with its existence and welfare, as were those of Thomas K. Fessenden, Charles F. Browning, and John P. Barstow.

The latter left us in the fall of 1893. He had been one of the Directors of our School for ten years, and ever proved a true friend, a wise counselor, and an example of a high type of a Christian gentleman.

Rev. Thomas K. Fessenden died in January, 1894. He was a Director of the School fifteen years. Of him, more than of any other, it may be said, he was the founder of the School, although the Hon. Charles Fabrique, of New Haven, took the initiatory step by causing to be introduced into the Legislature, a resolution or bill, looking to the creation of the School. Mr. Fessenden took charge of the same, and by his persistent efforts, carried it through. Of his great work in this direction, I need not speak at length, as it is too well known to you all and the public generally to need to be rehearsed by me. Suffice it to say, that in addition to his most efficient services while in the Legislature, donations have been received by the School to the amount of $175,000 or more, through his personal efforts. To his latest moments he ever entertained a deep abiding love for the School and its work. So long as there is such an institution as the Connecticut Industrial School for Girls, his name will be held by it in loving remembrance, and his great work in its behalf, will deserve its lasting gratitude.

Charles F. Browning died in June, 1894. He had been with the School as a Director nineteen years. Being Treasurer of the Board and residing in Middletown, he early became one of its most active and efficient members. As one of the Executive Committee he had much to do with the erection of new buildings, and such improvements as have been made from time to time. He often visited the School, and such was his genial manner, and genuine interest and sympathy in all that tended to promote its success, that it was ever a pleasure to meet him and a privilege to work with him.

As personal friends we loved them, as members of the Board of Directors we revered them, as Christian gentlemen we honored them, and as we recall their earnest, self-sacrificing work, which was the expression of their great love for the School and humanity, they are an inspiration to us to

emulate their example. Although we sadly miss their presence with us, and are deprived of the advice that their ripe experience made most valuable, still we would devoutly thank God for their lives, and pray that others may be given to the School who may take up the work as they left it, and carry it forward with continued success.

Thanking you, gentlemen, for your ever valuable counsel, your words of encouragement, and your continued kindness to me and mine, I have the honor respectfully to submit this Report.

W. G. FAIRBANK,
Superintendent.

Middletown, Conn., October 1, 1894.

DONATIONS.

October, 1893.—Murray Closson, city, 9 copies of New Republic.

December, 1893.—Murray Closson, city, 12 copies of New Republic.

Mrs. James Lawton, city, lot of Youth's Companions and Once a Week.

Mrs. Nellie Douglas, city, 1 framed motto, 1 globe, 2 cups and saucers, 14 handkerchiefs, 4 pin trays, 1 game, 2 pin cushions, 1 bottle cologne, 1 match-safe, 2 satchels, lot of cards.

Stoddard, Kimberly & Co., New Haven, $10.

Miss Susan Clarke, city, large lot of games.

James H. Bunce, city, 15 purses, 6 dozen bottles cologne, 11 baskets, 1 pin cushion, 10 pairs gloves, 1 dozen plated button hooks, 12 butter plates, 12 feather dusters, 33 Merry Christmas mottoes.

D. L. Weeks, city, 1 dozen china plates.

January, 1894.—Morgan Street Mission Sunday School, Hartford, 6 copies Youth's Companion for one year, 1 copy of Household for 1 year.

February, 1894.—Miss Edith Skilton, Watertown, 1 year's subscription to Epworth Herald.

Mrs. James Lawton, city, lot of papers.

Miss Annie Teller, Farmington, lot of papers.

March, 1894.—F. B. Weeks, city, 6 years' copies Scribner's Magazine.

Mrs. C. O. Stone, city, lot of papers, Youth's Companions and magazines.

Mrs. Joseph Dodd, city, large lot of papers and magazines.

August, 1894.—Mrs. Nellie Douglas, city, 22 books for library.

Murray Closson, city, 10 copies of New Republic.

The following papers have been regularly sent to the School, free of charge: Daily Courant, Hartford; Weekly Times, Hartford; Sentinel and Witness, Middletown; Daily Penny Press, Middletown; Daily Herald, Middletown; Christian Secretary, Hartford; Temperance Banner; The Howard Times, R. I.; The Summary, Elmira, N. Y.; Traveller's Record, Hartford; The Delaware County Advocate, Penn.; The Advance, Jamesburg, N. J.; Lyman School Enterprise, Westboro, Mass.; Industrial School Courier, Kearney, Neb.; The Budget, Farm School, Boston, Mass.; The Dawn, Meriden, Conn.

FARM REPORT.

Farm Products Furnished to School from October 1, 1893, to October 1, 1894.

Apples,	10	barrels,	$15 00
Apples (crab),	10	bushels,	6 50
Beets,	100	bushels,	60 00
Beans (shell),	30	bushels,	37 50
Beans (string),	15	bushels,	15 00
Butter,	2,296	pounds,	574 00
Blackberries,	39	quarts,	3 90
Celery,	800	heads,	20 00
Cherries,	14	quarts,	1 12
Corn (sweet),	1,500	ears,	60 00
Corn Fodder,	150	tons,	450 00
Cabbages,	6,415	heads,	320 75
Currants,	169	quarts,	16 90
Eggs,	310	dozen,	55 80
Gooseberries,	15	quarts,	1 50
Grapes,	2	bushels,	3 20
Hay,	48	tons,	624 00
Lettuce,	25	dozen heads,	7 50
Melons,	3	tons,	60 00
Milk,	45,115	quarts,	1,804 60
Onions,	10	bushels,	7 50
Potatoes,	475	bushels,	318 75
Peas,	15	bushels,	15 00
Pears,	8	bushels,	8 00
Pie Plant,	1,800	pounds,	54 00
Rye,	90	tons,	270 00
Raspberries (black),	55	quarts,	5 50
Raspberries (red),	241	quarts,	24 10
Strawberries,	142	quarts,	14 20
Squashes (summer),	10	dozen,	2 40
Squashes (winter),	¼	ton,	6 25
Turnips,	300	bushels,	45 00
Tomatoes,	300	bushels,	180 00
Quinces,	4	bushels,	10 00
Ice,	200	tons,	600 00

Meat Consumed.

Pork,	2,390 pounds,	$167 30
Beef,	2,475 pounds,	173 25
Poultry,	200 pounds,	30 00

The Live Stock Consists of:

6	Horses,	$500 00
20	Cows,	1,000 00
36	Hogs,	720 00
56	Pigs,	140 00
70	Shoats,	560 00
75	Hens,	37 50
75	Chickens,	37 50

TREASURER'S ANNUAL REPORT.

For the Year Ending September 30th, 1894.

RECEIPTS.

By balance, September 30, 1893,	$1,277 70	
From State for support of girls,	39,934 37	
From sale of boxes,	6,989 04	
From cash borrowed for "Building Fund,"	500 00	
From sundry sources,	310 66	
		$49,011 77

EXPENDITURES.

Paid 434 orders of the Executive Committee,	$48,933 41
Balance, September 30, 1894,	$78 36

SPECIAL APPROPRIATION ACCOUNT, 1893-4.

RECEIPTS.

October 8, 1893, by cash from State,	$3,635 00	
November 1, 1893, by cash from State,	2,000 00	
November 17, 1893, by cash from State,	4,365 00	
December 20, 1893, by cash from State,	2,500 00	
January 18, 1894, by cash from State,	2,500 00	
April 2, 1894, by cash from State,	3,000 00	
		$18,000 00

EXPENDITURES.

Paid 45 checks drawn on "Building Fund Account" at First National Bank, Middletown, Conn.,	$18,000 00

Respectfully submitted,

CLARENCE E. BACON, *Treasurer.*

This certifies that we have examined the above accounts of the Treasurer of the Connecticut Industrial School for Girls, for the fiscal year ending September 30, 1894, compared them with the vouchers, and found the same correct. The balance in the hands of the Treasurer on September 30, 1894, was seventy-eight dollars and thirty-six cents (78.36).

OSCAR LEACH,
E. LIVINGSTON WELLS, } *Auditors of Public Accounts.*

MIDDLETOWN, CONN., December 28, 1894.

Physician's Report.

To the Honorable Board of Directors of the Connecticut Industrial School for Girls:

Gentlemen:—The present report embraces the last two school years, a period notably characterized by a minimum amount of sickness among those committed to your official care. Never in its history has the School relatively required so little medical attendance as during the last year. The number of visits made from July 1, 1893, to July 1, 1894, was but thirty-four. These were not all on account of sickness. There are questions constantly arising which require medical advice, concerning the physical condition of the inmates, which interest those who are well almost as greatly as those who may be sick.

As the School grows in years, the same conditions obtain as in other communities — the essentials for comfort and health increase. At first the buildings were constructed in a large field. There were no walks worthy of the name. The wet paths, so markedly conducive to pneumonia, follicular tonsilitis and catarrhal diseases, have been replaced by something much better, and are still being and will continue to be improved. The results are apparent in the reports of the various years. The heating facilities of the present are in striking contrast to those of the first two houses constructed. I well remember when the south ends of the Street and Pratt Homes were warm, while the north ends were cold. The furnace was at the south end, while the prevailing winds were from the north. A system of steam heating has since been adopted, which is, I believe, competent to the requirements, as well as economical.

The original water supply was drawn from the city reservoir, but owing to the altitude of the school buildings and the elevation of the situation, the force was found inadequate for fire exigencies and sanitary completeness. This want was supplied some years ago by an independent reservoir and conduits, which afford a satisfactory supply with greater force.

Various methods for the disposal of the sewage from the several buildings were devised. All were faulty, insufficient and incomplete, while they imperiled not only the School community, but the town and city. While the growth of the Institution made the sewerage needs evident, it was only through the coöperation of the State Legislature and the City of Middletown that it was possible to construct a sewer which would, by connecting with the city sewerage system, carry the sewage of the Institution in a covered sewer to the river. This was an inevitable necessity, and until it was done your sanitary condition was open to severe criticism. It has been your pleasure, gentlemen, to have accomplished this result since your last Legislative report.

Another noticeable change,—though not so urgent as a sanitary measure, but still conducive to a healthy mental state in those residing at the Institution,—is the steady and continuous improvement in the beauty of the grounds. It is very marked. Each succeeding year increases the capacity, healthfulness and attractiveness of the School.

While the sanitary conditions surrounding your pupils are believed to be good, there is occasionally a mild epidemic influence apparent, but it has always seemed to be atmospheric rather than local, as evidenced by the same diseases being prevalent among the inhabitants of the town. Such was the case when during August, 1894, several cases of dysentery occurred in the Allyn Home suddenly and together. One death was caused by the disease, the only death at the School during the two years. There were seven cases

sufficiently serious to be noted. Others of mild type were treated. Besides these there have been treated: Three cases of phthisis pulmonalis, three of follicular tonsilitis, one each of anaemia, asthma sub-pectoral abscess, scrofulous abscess, croup, contraction of flexor muscles of the hand, ephemeral fever, chronic gastritis, jaundice and malaria. The two cases of continued fever mentioned in my last report recovered during the earlier weeks covered by this report. No cases of fever have since occurred.

I desire again to thank your Superintendent, his wife, and the matrons of the several Homes, for their kind coöperation in the care of those to whom I have been called. Their conscientious devotion merits kindly consideration from all—it has been truly parental.

Very respectfully,

F. D. EDGERTON, M. D.

115 Broad Street, October 1, 1894.

VISITING AGENT'S REPORT.

To the Directors of the Connecticut
Industrial School for Girls:

GENTLEMEN:—At the close of our fiscal year, Sept. 30, 1894, we have 123 girls not yet twenty-one years of age in homes outside the school.

As the years pass on, and our young girls come to womanhood, we are impressed more and more with the great importance of caring for them, after they leave the School, as a supplementary adjunct in carrying on the good work already begun, and without which many would fail of attaining the strength of character which enables them to overcome temptation.

We have many worthy representatives who have been educated and fitted for usefulness.

About one-fifth are known to be married, and with few exceptions are doing well.

A large number are honorably and worthily supporting themselves in household labor, trades, and teaching.

At the quarterly meeting held by your Board in June, it was voted that a paper which was read by the Visiting Agent at a sectional meeting of the National Conference of Charities and Corrections held in May, 1894, at Nashville, Tennessee, should be incorporated in the Biennial Report.

This paper gave to the Conference the methods pursued by the Connecticut Industrial School for Girls, and will also be to you a report of this part of our work.

The Placing-Out System, or How We Care for Our Girls After They Leave the School.

The class of girls sent to us are, in all essential characteristics, the same as are committed to like schools in other States.

We have orphan and county homes in Connecticut in which are placed the youngest and most innocent class of children. For all other girls over whom the State assumes control, who have not yet attained the age of 16 years, whether vicious or otherwise, no other place is provided save our School.

The industrial education of these, begun while as pupils with us, is continued by placing them in suitable families outside the School. This is understood as a promotion by them from a simple course to a higher employment in practical housekeeping, with increased responsibilities and privileges.

Before leaving the School every girl, unless she ranks among the deficients intellectually, must attain to a certain grade of character which is reached only by good conduct continued for a time, more or less protracted according to her success in overcoming bad habits and adopting better ones.

The time spent at the School is occupied in making suitable preparation to become acceptable members of such well regulated families as may desire their services as helpers.

This preparation or fitness is attained by laying aside untidy habits, coarse and unladylike manners, unrefined expressions, and by assuming a more respectable style of living than they had been accustomed to, and besides, acquiring all the moral, mental, and physical training that their limited stay in the School will allow. Their attainments are not expected to be complete, and they differ according to the disposition and keenness of perception of the girl, but in every case they are supposed to acquire such a degree of fitness as will make it safe for them to be trusted in a home where more privileges will be granted.

Our girls return to their own homes when the record of the family and surroundings will warrant it. These are subject to visitation, but not to the same extent as those with strangers. Still we are in frequent communication with

them, and if necessity requires, we recall them to the School, or their parents return them if they prove unmanageable.

About two-fifths of our girls are allowed to return to their relatives and guardians. The remainder are placed in stranger families, located for the most part in the smaller towns. A few only are in the cities.

In selecting homes we give preference to families in middle life who desire girls as helpers, not alone as servants; those willing to pay them wages and treat them with the kindly consideration of pupils who desire to be taught all that goes to make up good housekeeping. We never place them in boarding houses—never allow them to go to farmers' homes where they will not be carefully guarded as to all hired help. We do not place them in mills or stores, even though they were to receive greater remuneration.

We do not allow girls to be left in charge of a home during the absence of the housekeeper for any great length of time, unless she is a particularly strong character.

If the girl cannot go with the family, she is sent to the School until they return. We strive to exercise care in selecting families where the dispositions of both will harmonize.

All letters to and from the girl are read by the family employing her, save any she may wish to write the Superintendent or Visiting Agent. We are in correspondence with both, and if any trouble arises we visit the home at once if the case demands, or otherwise as soon as convenient.

Quite a number of our girls are married before they are twenty-one years of age. They are not allowed to receive the continued attentions of any young man without consulting the Visiting Agent, nor to be married without receiving from the Directors a certificate granting such permission.

If the friendship seems undesirable or uncontrollable, we recall the girl until her better judgment asserts itself, and then place her again.

We give each girl a neat outfit and dress her in such a way that the family will have no occasion to be ashamed of her personal appearance, either at home or wherever she may accompany them. We require from applicants desiring help testimonials which are verified by some person known to the Superintendent or his assistant.

With the greatest care we occasionally make mistakes. We find it necessary to transfer many girls from one home to another. Some seem to wear out their usefulness, others are unhappy, or discontented. Another class with their peculiarities of temperament are acceptable in no home but a few months at a time. These are some of the conditions which arise and make a change desirable. Sometimes the girl has taken on rude, boisterous, unladylike manners. If so at the time of a change, we return her to the School. Many happy results come from these changes.

We strive to respond as soon as possible to any case that demands attention, thus averting escapes and other unhappy issues.

That you may more fully appreciate the amount of work that one is called upon to perform in successfully placing girls in homes, I submit the following:

During the past seven and one-half years, the time we have had charge of the Connecticut Industrial School for Girls, we have placed 453 girls; 402 are now in outside homes; 51 have been returned to the School.

2	of these (453)	were	placed	10	times.	
1	"	"	"	"	9	"
4	"	"	"	"	8	"
10	"	"	"	"	7	"
11	"	"	"	"	6	"
17	"	"	"	"	5	"
33	"	"	"	"	4	"
47	"	"	"	"	3	"
111	"	"	"	"	2	"
217	"	"	"	"	1	"

In all, making 994 placings before a congenial home was found for all of them, or they became twenty-one years of age. With few exceptions these have all been accompanied to their different homes by the assistant in the office or Visiting Agent.

The wages range from five to twelve dollars per month. These prices seem small, but a good home, with the kindly advice, care, and instruction of a person who will act the part of a parent, is considered of more value to our girls than greater remuneration for services. At such prices we have

had no difficulty in securing homes in our own State for all the girls we could conscientiously recommend.

The demand is even greater than the supply.

A quarterly blank is sent to the parties having a girl, to be filled out and returned to the School. The blank contains itemized expenditures, also amount of wages. At these prices girls are able to have a suitable amount and quality of clothing.

We encourage every girl to save a part of her earnings each quarter, and send to the School with the statement of expenses. A bank book is taken out in the name of each girl sending money, the School acting as guardian of such funds, and her quarterly remittances are placed on the book to her credit.

The quarterly amount of wages and expenses are recorded in the girl's history, which is kept in the office at the School. If the girl is deficient intellectually and incapable of spending money wisely, when she becomes twenty-one years of age, we ask the selectmen of the town from which she was committed to appoint a conservator to take charge of the girl and her money.

A few girls, when they become of age, desire to leave the home in which they were placed and make a radical change, which appears more in keeping with what seems to them the most eventful period of their life. The reason for this, in part, may be that they entertain the thought that their independence will be more fully recognized by those who have not known them or been privileged to dictate to them as girls of the School.

We continue our interest in all our graduates, and if out of employment and they desire it, we secure positions for them.

The Visiting Agent can do more effective work if she has known and studied the case of each girl for a long time and understands her disposition and peculiarities of temperament. The Agent should be to the girl as an older sister, or better still, a mother, who, knowing the girl's life, nature, character and disposition, can do for her what no one can without this knowledge. To such an one the girl will confide her trials as well as her desires and anticipations for the future.

It will doubtless be a matter of interest to you to know the results attained by our system of placing girls. Taking

purity of character or chastity as a basis, should the question be asked, what percentage of the whole are leading creditable lives at the present time? We will answer, 92 per cent.; 84 per cent. have done well continuously since leaving the School. A few who at first made some mistakes have been reclaimed, and the creditable lives they are living at present makes it our duty to allow their names to increase the percentage from 84 to 92. Let it be understood that this percentage is the record of those who have passed from our School not only until they arrived at the age of twenty-one years (when our supervision ceases), but to the present time, though some of them are many years past their majority, thus showing a most important feature in the history of our work—its permanency for good. When we think of the number we have outside the School under our charge not yet twenty-one years of age, ranging at all times from 120 to 170, coming as they do from homes of such varied environments, and in many cases having been reared under untoward influences, and all these with few exceptions, girls from seventeen to twenty-one years of age, at a time when they seek society more than at any other period of their lives, we are surprised that more of them do not fall out by the way. We recognize the results thus far attained as most encouraging, yet we can never be satisfied until all are saved.

Our earnest desire is, as time goes on, that we may be imbued with greater wisdom and power, to enable us to accomplish even more in the future than in the past.

Respectfully submitted,

MRS. W. G. FAIRBANK,
Assistant Supt. and Visiting Agent.

Middletown, Conn., Oct. 1, 1894.

Acting School Visitor's Report.

To the Directors of the Connecticut Industrial School for Girls:

Gentlemen:—During the past year the schools have made creditable progress. The patient and untiring efforts of the teachers have characterized the work accomplished. The girls have shown much interest in their several studies, and have thus aided in making possible the general advancement of our school work.

The results attained, although commendable, are not what they might have been, owing to the overcrowded condition of our school-rooms, which has greatly impeded the progress of our work and lessened the possibility of our pursuing a perfectly graded system. Quite a large proportion of our new girls enter the lower grades, thus making it necessary for us to promote scholars before they are qualified to do the work of the higher departments.

We enter upon the work of the new year with this impediment to our progress removed. We have recently opened two new school-rooms. One of these is located in the new Home at the Russell building; the other, in the new addition to the Fessenden building. We have also furnished a goodly number of new text-books, which will aid much in perfecting the classification of each department.

In the Russell building we have two school-rooms which are ungraded and distinct from the other school departments and from each other. They are designated as Russell Department No. 1 and Russell Department No. 2. Russell Department No. 1 is an evening school. The work accomplished by the scholars of this department will, of necessity be limited, as the time given for instruction is much shorter than that of the day schools. Russell Department No. 2 is a new division, which has just been organized. It is a day school, and the character of the work pursued is similar to that of the common district school.

Heretofore we have had but four graded departments. The new room at the Fessenden building affords us an

opportunity to alter our whole system and make some much needed changes. We begin the year with five newly graded departments, and are now prepared to do a much more thorough and systematic work.

The present grade of rooms as given in this report is intended only as a basis for the year's work in each department. We do not confine ourselves exclusively to the text-book, but the teacher is expected to supplement this work by the use of reference books and her own knowledge of the subject. In connection with the Reading exercises, we make use of several information readers for sight-reading. Our Spelling is a written exercise, and is conducted with great care. It has been our experience that the girls, as they come to us, are sorely in need of careful and thorough instruction in this branch of study. In the higher grades, our girls have done very creditable work in Arithmetic. It is our aim to teach the girls to do independent thinking. Assistance is always gladly and freely given to any scholar, but we believe it should be done in such a manner as to strengthen their mental faculties and thus save them from being dependent on others when they are capable of doing independent work. It is our purpose that, in every branch of study, the instruction given shall be in touch with the best methods pursued in the leading grammar schools of this State.

Your attention is now invited to the following statistics:

NUMBER OF GIRLS IN SCHOOL OCTOBER 1, 1894.

First Department,	39
Second Department,	38
Third Department,	31
Fourth Department,	31
Fifth Department,	30
Russell Department No. 1,	36
Russell Department No. 2,	31
Total,	236

NUMBER OF GIRLS RECEIVED DURING THE YEAR.

Qualified by scholarship to enter:—

First Department,	2
Second Department,	6
Third Department,	5
Fourth Department,	28
Russell Department No. 1,	8
Total,	49

GIRLS RETURNED.

First Department,	37
Second Department,	14
Third Department,	5
Fourth Department,	1
Russell Department No. 1,	13
Total,	70

GIRLS SENT OUT.

First Department,	50
Second Department,	19
Third Department,	13
Fourth Department,	3
Russell Department No. 1,	21
Total,	106

GRADE OF ROOMS, OCTOBER 1, 1894.

Russell Department No. 1.—Ungraded.

Russell Department No. 2.—Ungraded, but is classified, The following studies are taught: Reading, Spelling, Writing, Arithmetic, Geography, History, Physiology, Oral Instruction in Language, Mental Arithmetic, and Botany.

Fifth Department.—First Reader, Spelling, Rudiments of Writing, first year's work in Peck's Primary Arithmetic, Oral Instruction in Geography, Physiology, Language, Mental Arithmetic, and Botany.

Fourth Department.—Second Reader, Spelling, Writing, second year's work in Peck's Primary Arithmetic, Primary Geography (first half), Oral Instruction in Physiology, Language, Mental Arithmetic, and Botany.

Third Department.—Third Reader, Spelling, Writing, third and fourth year's work in Peck's Primary Arithmetic, Primary Geography (second half), Physiology, Oral Instruction in Language, Mental Arithmetic, and Botany.

Second Department.—Fourth Reader, Spelling, Writing, Written Arithmetic (first half), Geography (first half), Physiology, Oral Instruction in Grammar, Mental Arithmetic, and Botany.

First Department.—Fifth Reader, Spelling, Writing, Written Arithmetic (second half), Geography (second half), Physiology, United States History, Botany, Grammar, and Mental Arithmetic.

Respectfully submitted,

WILLIAM E. FAIRBANK,

Acting School Visitor.

MIDDLETOWN, CONN., Oct. 1, 1894.

APPENDIX A.

BY-LAWS.

CHAPTER I.

DIRECTORS.

1. The government of the School shall be vested in a Board of fifteen Directors, of which the Governor, Lieutenant-Governor, and Secretary of State shall be Directors, *ex-officio*.

2. The term of office of the eleven Directors chosen shall be three years, except as hereinafter provided. At the close of the third year after their appointment they shall be divided by lots into three classes. The full Board of Directors shall then choose by ballot, three or four Directors to serve in the place of the first class, whose places shall then become vacant. At the close of the fourth year, the Board shall choose three or four in the places of the second class. At the close of the fifth year, three or four in the places of the third class, and annually thereafter in the places of the senior class, whose places shall become vacant upon the appointment and qualification of their successors. The Board may fill all vacancies occurring during the year, and the retiring members shall be eligible for reëlection. No Director shall receive compensation for his services as a Director, but shall be allowed for his expenses incurred in the discharge of such services.

3. The Directors shall exercise a general supervision over the Institution, and shall frequently and carefully inspect it in all its departments. They shall have power to make, alter, or amend all by-laws. They shall appoint and regulate the duties and salary of the Superintendent, and remove him at their discretion. They shall be the guardians of the girls during the period of their commitment (unless otherwise provided for); shall procure for them suitable employment and instruction while at the School, and shall transfer them to suitable private families, or other places of abode at the earliest proper period, and shall see that they receive equitable and kind treatment from those to whom they are committed on leaving the School; and, in general, the Directors shall possess all powers needful in order to the proper discharge of their official duties. Four of their number shall constitute a quorum for the transaction of ordinary business, but seven shall be required for the purchase and sale of the real estate of the Institution, for the appointment of new Directors and of the Superintendent, and for the change of its by-laws.

4. They shall hold an annual meeting the third Wednesday of September, and quarterly meetings the third Wednesday of December, March and June. At the annual meeting they shall make a full and verified report of their trust, choose a President, Secretary, Treasurer, and an Executive Committee, and a Visiting Committee of twelve ladies, and transact such other business as the interests of the Institution shall demand.

5. At the quarterly meeting there shall be a careful review of the state and management of the Institution, and of the progress and condition of the inmates.

6. The President shall call extra meetings at the request of any two Directors, and perform all the other duties usually pertaining to his office.

7. The Secretary shall keep a full record of the meetings of the Board, prepare such papers as they shall direct, give notice in writing to each Director of the time and place of meetings, and communicate to the Treasurer the action of the Board in regard to its funds.

8. The Treasurer shall have charge of the trust funds of the School, and give a full report thereof at their annual meeting, and at other meetings when required, and shall give such bonds and receive such compensation as the Executive Committee shall deem proper.

9. The Executive Committee shall, when necessary, act for the Board during the intervals between its meetings, but shall make no change in its plan or discipline without the consent of a majority of the Directors. They shall be the especial advisors of the Superintendent, and report their doings to the next meeting of the Board.

10. Two of the Visiting Committee of Ladies shall be requested to visit the Institution at least once in two months, and thoroughly inspect its domestic arrangements, and report thereof to the Secretary of the Board. Their expenses shall be defrayed from the funds of the School.

11. The Directors, or any two of them, may give to the Registrar or Town Clerk their written consent to the marriage of any girl under the guardianship and control of this corporation, when, in their judgment, such consent would be proper, pursuant to the statute law concerning marriage license.

CHAPTER II.

OFFICERS.

1. The officers of the Institution shall consist of a Superintendent and Assistant Superintendent, appointed by the Directors; a Matron and Assistant Matron for each Home; a Principal Teacher, a Farmer, and such other instructors and assistants as may be found necessary.

The officers shall be appointed and dismissed, and their salaries regulated by the Superintendent, subject to the approval of the Board of Directors at their next subsequent meeting.

2. They shall reside at the Institution. None of the subordinates shall leave it without the permission of the Superintendent. All shall aid in maintaining the rules and discipline, and give such assistance as shall be necessary in order thereto, and be especially careful to sustain each other in the presence of the girls.

CHAPTER III.

SUPERINTENDENT.

1. The Superintendent shall have the general charge of the Institution; shall be the executive of the Directors, and see that all their instructions and the rules of the School are carried out.

2. He shall frequently inspect the Institution in all its departments, and see that the subordinate officers are punctual and faithful in the discharge of their respective duties.

3. He shall keep a journal, and make record of all occurrences worthy of notice, which record shall be subject to the inspection of any member of the Board.

4. He shall perform the correspondence, keeping files of all letters received and copies of those sent, so far as of importance, for reference. In suitable books he shall keep regular and complete accounts of all receipts and expenditures, and of all property entrusted to his care, showing the expense and income of the Institution.

5. He shall make out and present to the Comptroller the bills for weekly board and other necessary expenses of the girls, according to law.

6. Under the advice and direction of the Executive Committee, he shall procure the necessary supplies for the Institution, and purchase all such articles and materials as may be wanted for the support and employment of the girls, and dispose of all articles raised on the farm, or manufactured by them, which are not wanted for use.

7. At the annual meeting he shall make a report to the Board of everything pertaining to the inmates and general state of the School up to the 1st of December, and at each quarterly meeting give such information as the Directors require, and at all times be ready to perform whatever other duties may be required for the good of the Institution.

8. In connection with the Executive Committee, he shall decide upon all applications for the services of the girls. No inmate shall be permitted to perform service in a public house, or in a family where spirituous liquors are used as a beverage, or be indentured to an unmarried man.

9. He shall keep a register of the name and age of each inmate of the Institution, with the date of her admission; a sketch of her life, including her birthplace; a description of her person; the name, residence, nativity and character of her parents; by whom committed; for what cause; when and how discharged; also a record of her conduct while in the Institution, and, as far as possible, after she shall have left it.

10. Whenever a girl is placed out at service, he shall keep a record of the person, residence and employment of the employer, and of the service and terms for which she is employed. In case of his receiving notice of the ill-treatment of any girl, it shall be his duty at once to examine into the case and to take such measures in reference to it as the circumstances require.

11. The Assistant Superintendent may, by direction of the Superintendent, perform any of his duties, and in his absence shall have control and supervision of the School.

CHAPTER IV.

MATRONS.

1. A Matron shall be placed over each house, who shall have its general superintendence and discipline, and be held responsible for all its officers and inmates and management, under the supervision and with the advice and aid of the Superintendent.

2. She shall keep a full record of the entrance and leaving, of the conduct and improvement of the girls in her family, of all work done, and of everything necessary to show the state of the Home; which record shall always be open to the inspection of the Superintendent. She shall make an annual report to the Directors.

3. She shall see that cleanliness, order and propriety are maintained in all the apartments of her house, and in the person, dress and rooms of the inmates, and that suitable care is given to the sick.

4. She shall endeavor especially to impress upon her charge the duty and advantage of a moral and religious, and the evils and miseries of a wicked life; and inculcate all the practical virtues that adorn the life and beautify the character.

5. She shall see that her assistants are diligent and faithful in the discharge of their appropriate duties, discreet and regular in their deportment, and strict in their observance of the regulations of the Institution, and report any remissness to the Superintendent.

CHAPTER V.

ASSISTANT MATRONS.

1. In each family there shall be an Assistant Matron, who shall have charge of the kitchen, laundry, or other domestic concerns.

2. She shall be responsible to the Matron for the cleanliness and order of her department, for the conduct, industry and instruction of the girls employed with her, and, in the absence of the Matron, shall take charge of the Home.

CHAPTER VI.

TEACHERS.

1. The Principal Teacher shall have charge of the discipline and instruction of the School, and of the order and cleanliness of the School room; she shall have the care of the Library, and be responsible for all books and furniture belonging to the School and Chapel She shall render in the Home in which she resides such assistance as is necessary for its order and discipline. She shall make an annual report.

2. The Assistant Teachers shall, during school hours, instruct the classes assigned to them, and at other times, under the Matron, perform such duties as may be appointed to them in the Homes.

CHAPTER VII.

FARMER.

1. The Farmer shall attend to the stock and take proper care of the barns, and in winter of the furnaces; shall do the teaming and work of the farm so far as he is able, and render the Superintendent any assistance he may require, not inconsistent with other duties.

CHAPTER VIII.

GENERAL REGULATIONS.

1. The hours of labor, study, rest, and recreation shall be arranged from time to time by the Superintendent and Matrons.

2. All persons employed in the Institution, in whatever capacity, are required to devote their whole attention to the performance of their duties. Each officer shall see that the rules and regulations are fully observed.

3. No inmate will be permitted to leave the premises, except by permission of the Superintendent.

4. The Institution will be open for visitors each Wednesday, from half-past two till five o'clock P. M.; but visitors cannot be admitted to any part of the premises, at this or other times, without the express permission of the Superintendent or of his assistant.

5. Punishment may be inflicted by the deprivation of amusement, and recreation, by withholding some favorite article of food, or some privilege or indulgence, by loss of rank and standing in the class, by imposing some irksome duty, by close or solitary confinement for a limited period, and, when it becomes absolutely necessary to maintain good order and enforce the rules and regulations of the Institution, by corporal infliction by the Superintendent, or under his direction, a record of the time, manner, and circumstances of which punishment shall be made.

6. These By-Laws may be altered, amended or repealed at any regular meeting of the Directors.

APPENDIX B.

LAWS

Relating to the Connecticut Industrial School for Girls.

AN ACT INCORPORATING THE CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Resolved by this Assembly:—SEC. 1. That James E. English, William A. Buckingham, Esther Pratt, Timothy M. Allyn, Edmund G. Howe, Roland Mather, Alfred Smith, Henry A. Perkins, Francis B. Cooley, George Beach, Richard S. Ely, John B. Eldridge, John H. Goodwin, James Root, C. C. Lyman, Caroline A. Street, Mary Hillhouse, Mary L. Skinner, Jane Hubbard, Hervey Sanford, William W. Boardman, Ezra C. Reed, Richard S. Fellowes, Nathan Peck, Charles Fabrique, Cornelius S. Bushnell, Moses Y. Beach, H. D. Smith, Thomas K. Fessenden, and their associate subscribers, be, and they are hereby constituted a body politic and corporate, by the name of "THE

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS," and by that name shall have perpetual succession, and may sue and be sued, may plead and be impleaded, in the courts of this State and elsewhere, may have, use or change a common seal, may receive, hold, or convey any estate, real or personal, that may be committed to it, may act as a guardian to the person of any girl who, between the ages of eight and *fifteen years shall be committed to its charge, according to law, for the physical, mental, and moral training of such girl, which guardianship of such girl shall supersede any other guardianship of parents or guardians during the time that such girl is under the charge of this corporation, and no longer; and may make such by-laws and appoint such officers and agents as shall be specified in such by-laws, or as may be necessary to carry out the purposes of the corporation; but it shall be provided by such laws that the Governor, Lieutenant-Governor, and Secretary of State shall be *ex-officio* of the principal officers of the corporation.

SEC. 2. The said corporators shall meet for the first time at the call of three of the corporators to organize this corporation, adopt by-laws, and do whatever else may be necessary and proper.

SEC. 3. The funds, property, and estate which may be granted to or held by said corporation for the uses hereinbefore expressed, shall, with the income thereof, be exempted from taxation.

SEC. 4. This resolution may be amended, altered, or repealed, at the pleasure of the General Assembly.

Approved, July 27th, 1868.

GENERAL ASSEMBLY, MAY SESSION, 1873.

AN ACT AMENDING THE ACT INCORPORATING THE CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. The age of girls committed to the Connecticut Industrial School for Girls shall be between eight and *sixteen years.

SEC. 2. In addition to the Directors now existing, two other Directors shall be annually chosen in the manner provided by law.

SEC. 3. This act shall take effect from its passage.

Approved, July 1st, 1873.

REVISED STATUTES OF 1888.

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

SEC.

3638. Made a school district.
School committee; acting school visitor.
Public Money. (See Act 1893, p. 71.)
3641. Who may be sent to it.
3642. When officers may arrest and procure commitment of girls.
3643. Costs on mittimus.
3644. Directors may discharge from school.
3645. Age, etc., to be endorsed on mittimus.
3646. Industrial School to be guardian, etc.
488. Courts of Probate shall have concurrent jurisdiction in commitments.
2110. Cities and Towns may make By-Laws concerning Truants.
2111. Truant Officers.
2112. Truants, arrest of, etc.
2113. Truants may be committed to the Reform School or to the Industrial School. (See Sec. 2117.)
2114. Fees of Officers Arresting Truants.
2115. Warrant and Hearing.
2116. Suspending Judgment.
2117. Truants and Vagrant Girls may be Committed to the School.
3659. Certain Children not to be sentenced to the School, unless, etc.
3660. Transfer of Children from the School to the County Home.
3661. Guardianship not affected.
1497. Aiding Escape from School.
3676. Religious Instruction.
3677. Binding out to Service.

SEC.

3678. Parent or guardian may indenture child to the School.
3679. Privileges of Indentured Child.
3680. Sentence of girl may be in the alternative.
3681. Court may make order as to children during pendency of proceedings for commitment. Expense to be taxed as part of the costs. Restriction in cases of contagious diseases or where charged with crime.
1740. Apprentices may be indentured by Selectmen.
1743. Apprentices may be released from service if neglected by Master.
1885. Inspection of Institution by State Board of Charities.
1886. School to be visited once a month by members of State Board of Charities.
1567. Unlawful taking of fees and commissions by public officers, trustees, etc.
1568. Furnishing supplies by officer or trustee when prohibited.
3719. Justices of the Peace.—Fees.
3709. Judge of Police or City Court.—Fees.
3729. Sheriffs' and other Officers' Fees.
105. Death; Notice of, to be given by Superintendent.
379. Estimates of State expenses to be made biennially.
380. By whom to be made.
331. Number of annual reports to be printed.

PUBLIC ACTS OF 1893.

(See Pages 70 and 71.)

CHAP.

CXXII. Appeals from commitments.
Appeals, by whom taken.
Appeals tried by jury.
CLXIV. School Committee.

CHAP.

CLXIV. Acting School Visitor.
Public money.
CLXXXVIII. Support of girls committed to the School.

Made a School District.

Section 3638. The Connecticut Industrial School for Girls shall, so long as it remains an incorporated institution of this State and maintains a school for the benefit of children connected therewith, be a separate school district, with a territorial limit including the grounds and buildings occupied by the inmates of said institution as homes. All other territory belonging to said institution shall be a part of the district to which the same territory belonged before the Industrial School for Girls was established.—*1886, Chap. 96, Sec. 1.*

Who May be Sent to It.

Sec. 3641. The parent or guardian of any girl between the ages of eight and sixteen years, or a selectman or grand juror, or other informing officer, of the town where she may be found, may present a written complaint to the judge of the Court of Probate for the district in which such town is, or to the judge of the Police Court of any city, sitting in chambers, where she may be found, or to any justice of the peace of such town, alleging that she has committed any offense within the final jurisdiction of a justice of the peace, or belongs to the class specified in sections 2109, 2110, and 1740, or that she is leading an idle, vagrant or vicious life, or is in manifest danger of falling into habits of vice, praying that she may be sent to the Connecticut Industrial School for Girls, and such judge or justice of the peace shall thereupon, after notice to her and such other notice as he may deem proper, inquire into said complaint, and on being satisfied of the truth of the allegations therein, may order her to be committed to the guardianship and control of such School until she shall arrive at the age of twenty-one years, unless sooner lawfully discharged; and if he finds that she has committed an offense punishable by imprisonment, other than imprisonment for life, she may be sentenced to the Connecticut Industrial School for Girls, or judgment may be suspended, on such terms, and for such time, as he may prescribe; and said authority may issue a warrant for the execution of such sentence; but this chapter shall not be construed to deprive any girl of fourteen years of age and upwards from the privilege of choosing her own guardian, with the approval of the Court of Probate, as provided by law.—*G. S. 1875, Chap. 94, Sec. 1; 1875, Chap. 97; 1878, Chap. 122.*

When Officers may Arrest and Proceed Against Girls.

Sec. 3642. Any proper officer may arrest within his precincts any girl whom he shall judge to be between the ages of eight and sixteen years, whom he shall find in any improper place or situation, and who is, in his judgment, liable to be arrested for any of the offenses specified in the preceding section, and make complaint and proceed in the same manner as a parent could do under the provisions of the preceding section.—*G. S. 1875, Chap. 94, Sec. 2; 1876, Chap. 52.*

Costs on Commitment.

Sec. 3643. The authority committing any girl to said School shall transmit a certified copy of the items of the costs on the complaint to the clerk of the Superior Court for the County in which the trial was had, within thirty days after the trial, and said costs shall be taxed and paid as costs are taxed and paid in criminal causes coming to the Superior Court from an inferior court.—*1883, Chap. 11.*

Discharge by Directors.

Sec. 3644. The Directors, or any two of them, may discharge from said School and return to her parent or guardian, or to the selectmen of the town, any girl who, in their judgment, ought not to be retained.—*G. S. 1875, Chap. 94, Sec. 4.*

Age, etc., to be Endorsed on Mittimus.

Sec. 3645. The authority committing any girl to said School shall ascertain as nearly as possible, and endorse on the mittimus, her age, parentage, birthplace, offense, and such other facts relative to her as may aid in her proper care and instruction in the School; and the age thus ascertained shall be taken as the true age of said girl with reference to the term of her commitment.—*G. S. 1875, Chap. 94, Sec. 5.*

Industrial School to be Guardian.

Sec. 3646. In addition to the guardianship of the person, the Connecticut Industrial School for Girls shall be the guardian of any estate that may be acquired by the personal services of any girl while under its guardianship and control.—*1885, Chap. 5.*

Selectmen may Bind out Children Negligently Cared for at Home.

Sec. 2109. The selectmen, in every town, shall inspect the conduct of the heads of families, and if they find any who neglect the education of the children under their care, may admonish them to attend to their duty, and if they continue negligent, whereby the children grow rude, stubborn and unruly, they shall, with the advice of a justice of the peace, take such children from those who have the charge of them, and bind them out to some proper master, or to some charitable institution or society incorporated in this State for the care and instruction of such children, males till twenty-one and females till eighteen years of age, that they may be properly educated and brought up in some lawful calling.—*G. S. 1875, 127, Sec. 7.*

Cities and Towns may make By-Laws Concerning Truants.

Sec. 2110. Each city and town may make regulations concerning habitual truants from school, and children between the ages of seven and sixteen years, wandering about its streets or public places, having no lawful occupation, nor attending school, and growing up in ignorance; and such by-laws, also, respecting such children, as shall conduce to their welfare and to public order, imposing suitable penalties, not exceeding twenty dollars for any one breach thereof; but no such town by-laws shall be valid, until approved by the Superior Court in any county.—*G. S. 1875, 127, Sec. 8.*

Truant Officers.

Sec. 2111. Every town, and the mayor and aldermen of every city, having such by-laws, shall annually appoint three or more persons, who alone shall be authorized to prosecute for violations thereof. All warrants issued upon such prosecutions shall be returnable before any justice of the peace, or judge of the city or police court of the town or city.—*G. S. 1875, 127, Sec. 9.*

Truants, Arrest of, etc.

Sec. 2112. The police in any city, and bailiffs, constables, sheriffs and deputy sheriffs in their respective precincts, shall arrest all boys between eight and sixteen years of age, who habitually wander or loiter about the streets or public places, or anywhere beyond the proper control of their parents or guardians, during the usual school hours of the school term; and may stop any boy under sixteen years of age, during such hours, and ascertain whether he is a truant from school; and if he be, shall send him to such school.—*1877, Chap. 98.*

Truants may be Committed to Reform School (or to the Industrial School. See Sec. 2117.)

Sec. 2113. Any boy arrested a third time under the provisions of the preceding section, if not immediately returned to school, shall be taken before the judge of the criminal or police court, or any justice of the peace in the city, borough or town where such arrest is made; and if it shall appear that such boy has no lawful occupation, or is not attending school, or is growing up in habits of idleness or immorality, or is an habitual truant, he may be committed to any institution of instruction or correction, or house of reformation in said city, borough, or town, for not more than three years, or, with the approval of the selectmen, to the State Reform School.—*1877, Chap. 98.*

Fees of Officers Arresting Truants.

Sec. 2114. Officers other than policemen of cities shall receive for making the arrests required by the two preceding sections, such fees, not exceeding the fees allowed by law for making other arrests, as may be allowed by the selectmen of the town in which such arrests are made; but unless a warrant was issued by a judge of the criminal or police court, or by a justice of the peace, the officer shall, before receiving his fees, present to the selectmen of the town a written statement showing the name of each boy arrested, the day on which the arrest was made, and if the boy was returned to school, the name or number of the school to which he was so returned.—*1877, Chap. 98.*

Warrant and Hearing.

Sec. 2115. In all cases arising under the provisions of the three preceding sections, a proper warrant shall be issued by the judge of the criminal court of the city, or by a justice of the peace in the borough or town, where such arrest is made; and the father, if living, or if not, the mother or guardian of such boy, shall be notified, if such parent or guardian can be found, of the day and time of hearing. The fees of the judge or justice shall be two dollars for such hearing; and all expenses shall be paid by the city, borough, or town in and for which he exercises such jurisdiction.—*G. S. 1875, 128, Sec. 12.*

Suspending Judgment.

Sec. 2116. After the hearing in any such case, such judge or justice of the peace may, at his discretion, indefinitely suspend the rendition of judgment.—*G. S. 1875, 128, Sec. 13.*

Truant and Vagrant Girls may be Committed to the School.

Sec. 2117. Upon the request of the parent or guardian of any girl between eight and sixteen years of age, a warrant may be issued for her arrest in the same manner and on the same conditions as is provided in the preceding sections with respect to boys; and thereupon the same proceedings may be had as are above provided, except that said girl may be committed to the Connecticut Industrial School for Girls.—*G. S. 1875, 128, Sec. 14; 1876, Chap. 52.*

Certain Children not to be Sentenced to the School, Unless, etc.

Sec. 3659. No child belonging to either of the classes specified in section 3655 shall be sentenced or committed by any court or justice of the peace to the State Reform School, or the Connecticut Industrial School for Girls, unless such child is found to have committed an offense punishable by law, or is leading an idle, vagrant, or vicious life, or the court or magistrate is of opinion that the child's previous circumstances and life have been such as to make it desirable that such child should be placed under the restraint, care and guardianship of one of said schools.—*1886, Chap. 92.*

Transfer of Children from the School to the County Home.

Sec. 3660. The Directors of either of said schools may at their discretion transfer any child belonging to either of the classes specified in section 3655, sentenced or committed to such school, to the county home of the county from which such child was sentenced or committed, after reasonable notice to the board of managers thereof. The superintendent of such school shall immediately notify the comptroller of such transfer, and the expense of supporting the child in such home shall be paid by the State, as provided in case of children committed to temporary homes by process of law.—*1886, Chap. 92.*

Guardianship not Affected.

Sec. 3661. Such transfer shall not divest the school from which the child is transferred of its guardianship and control over such child, unless the same be relinquished by the board of directors of such school.—*1886, Chap. 92.*

Death; Notice of to be Given by Superintendent.

Sec. 105. Whenever any boy committed to the State Reform School, or any girl committed to the Industrial School for Girls, shall die, the Superintendent shall cause immediate notice thereof to be sent by mail to the registrar of births, marriages and deaths of the town from which said boy or girl was so committed.—*1884, Chap. 94, p. 372.*

Aiding Escape from School.

Sec. 1497. Every person who shall aid or abet any girl in escaping from the Connecticut Industrial School for Girls, or any boy from the State Reform School for Boys, or who shall knowingly harbor such boy or girl, or aid in abducting them from persons to whose care and service they have been properly committed, shall be fined not less than fifty nor more than one hundred dollars, or imprisoned not more than sixty days.—*1876, Chap. 52.*

CHAPTER CCXXX.

GENERAL PROVISIONS.

Religious Instruction.

Sec. 3676. Equal privileges shall be granted to clergymen of all religious denominations to impart religious instruction to the inmates of the Schools mentioned in Chapters ccxxv. and ccxxvi.; and every opportunity shall be allowed such clergymen to give such inmates, belonging to their respective denominations, such religious and moral instruction as they may desire; and the trustees of each of said institutions shall prescribe reasonable times and places, not inconsistent with its proper management, when and where such instructions may be given, which shall be open to all who may choose to attend.—*G. S. 1875, Chap. 98, Sec. 1.*

Binding Out to Service.

Sec. 3677. The Trustees of the State Reform School may bind out as apprentices, and the Directors of the Connecticut Industrial School for Girls may bind out to service, persons committed to such schools, respectively, for a term not exceeding the term for their commitment.—*G. S. 1875, Chap. 98, Sec. 2.*

Parent or Guardian may Indenture Child to the School.

Sec. 3678. Any parent or guardian may indenture a child or ward to the State Reform School, or to the Connecticut Industrial School for Girls, on such uniform terms as may be agreed upon between such parent or guardian and the trustees or directors of said schools, the expense to be paid quarterly in advance; and in case of any failure on the part of such parent or guardian so to pay said expense, the Superintendent of said State Reform School, or Connecticut Industrial School for Girls, as the case may be, may sue on such agreement.—*G. S. 1875, Chap. 98, Sec. 3.*

Privileges of Indentured Child.

Sec. 3679. Every child indentured or admitted to the State Reform School, or the Connecticut Industrial School for Girls, shall be entitled to the same supervision, medical treatment, support and education, and subject to the same regulations, employment, and restraint as all its other inmates.—*G. S. 1875, Chap. 98, Sec. 4.*

Sentence of Girl may be in the Alternative.

Sec. 3680. The sentence of any girl to the Connecticut Industrial School for Girls may be in the alternative, as in the case of sentence to the State Reform School.—*G. S. 1875, Chap. 98, Sec. 5.*

Court may make Order as to Children during pendency of Proceedings for Commitment.—Expense to be Taxed as Part of the Costs.—Restriction in Cases of Contagious Diseases or where Charged with Crime.

Sec. 3681. When in any proceedings for the commitment of any child under sixteen years of age to the Connecticut Industrial School for Girls, or to the State Reform School, or to any temporary home for dependent and neglected children, a continuance of such cause is allowed, the court or justice of the

peace before whom such proceedings are pending may make such order for the care and custody of such child during such continuance, and until the final disposition of the cause, as said authority shall judge to be for the welfare of said child; and the fees and expenses incurred in such commitment, care, and custody shall be taxed and paid as part of the costs in said proceedings, in the same manner as in cases of commitment to said institutions. But during the adjournment of the case of any child suffering from any contagious disease, or charged with any crime or vice, such child shall not be committed to the custody of a county temporary home or of any orphan asylum.—*1887, Chap. 71.*

Inspection of Institution by State Board of Charities.

Sec. 1885. The board may inspect all almshouses, homes for neglected or dependent children, asylums, hospitals, and all provisions or institutions for the care or support of the dependent or criminal classes; and they shall inspect all institutions in which persons are detained by compulsion, to ascertain whether their inmates are properly treated, and, except in cases of detention upon legal process, to ascertain whether any have been unjustly placed, or are improperly held, therein, and may examine witnesses, and send for persons and papers, and correct any abuses found to exist, in such manner as not to conflict with any personal, corporate, or statutory rights, acting, so far as practicable, through the persons in charge of such institutions, and with a view to sustain and strengthen their rightful authority; and no measures shall be adopted without the assent of the persons so in charge, except at a meeting of the board, at which at least four members shall be present, or by a written order, signed by a majority of the board. An appeal may be taken to the Governor from any action of the board, by the persons in charge of such institutions.—*1884, Chap. 77, p. 360, Sec. 2.*

School to be Visited Once a Month by Members of State Board of Charities.

Sec. 1886. The State Prison, the State Reformatory and Industrial Schools and State Insane Asylum shall be visited as often as once a month, and by at least one member of each sex; no previous notice of such visits shall be given to the person in charge of the institution visited, and at every such visit an opportunity shall be offered to each inmate for private conversation with some member of the board. Any communication directed to said board, or to any member thereof, by any inmate of said institutions, shall be immediately forwarded, postpaid, to the postoffice by the person in charge, without inspection; and any inmate of said institutions may personally deliver to any member of said board, and any member of said board may receive, any communication, without interference or inspection of the person or persons in charge. The inmates of said institution shall be informed of their rights under this section by the persons in charge, to the satisfaction of said board, or any visiting member thereof.—*1884, Chap. 77, p. 361, Sec. 3.*

Apprentices may be Indentured by Selectmen.

Sec. 1740. If any person who has had relief from any town, shall suffer his children to misspend their time, and shall neglect to employ them in some honest calling, or if any person does not provide competently for his children,

whereby they are exposed to want, or if any poor children in any town live idly or exposed to want, and there are none to take care of them, the selectmen of such town, with the assent of a justice of the peace, shall indenture such children, to be apprentices to some proper trade for said term, and may indenture them in like manner, to any society, incorporated for the purpose of educating and relieving orphans, or destitute children, whose place of business is in this State, and may contract with such society to defray, wholly or in part, the expenses of such child while in the institution, to an amount not exceeding one dollar and fifty cents a week; and such society shall have the same authority, with regard to such children, as over those surrendered to them by their parents. —*G. S. 1875, 193, Sec. 3.*

Apprentice may be Released from Service if Neglected by Master.

Sec. 1743.—Parents, guardians, selectmen, trustees of the State Reform School, and directors of the Connecticut Industrial School for Girls, shall inquire into the treatment of apprentices indentured by them respectively; and if, after the making of such indenture, any masters and apprentices shall remove from the town where such indenture was made, to any other town in this State, or if the guardians of such apprentices are absent, refuse, or are unable to act, then the selectmen of the town where such masters and apprentices reside at the time, shall make such inquiry, and if they, the parents, guardians, selectmen, trustees, or directors aforesaid, find that the masters do not perform their part of the indenture, they shall complain to a justice of the peace in the town where such masters and apprentices reside, who shall cause such masters and apprentices to come before him, and reconcile them if he can, and if he can not, may bind the master to appear at the next term of the court of common pleas, or district court, if there be such courts in the county in which such masters and apprentices reside, and if there are no such courts in said county, then he shall bind him to appear at the next Superior Court in said county having civil jurisdiction, and also the apprentice, or give order for his custody in the meantime and for his appearance at said court, and if it finds that the master has failed to perform his part of the indenture, it may discharge the apprentice from the service of the master, and cancel the indenture, with costs against the master, and award execution accordingly; but if the complaint shall be found untrue, and without probable cause, it shall award costs to the master against the complainant.—*1875, Chap. 73.*

Unlawful Taking of Fees and Commissions by Public Officers, Trustees, etc.

Sec. 1567. Every person being a public officer, trustee or agent, or a member of the board of management of any public or private institution, or corporation, who shall receive for his own use, directly or indirectly, from any person with whom he makes a contract, or transacts any business, as such public officer, trustee, or agent, or with whom the board of management of which he is a member, makes a contract or transacts any business, any payment, commission, or compensation, whether direct or under the form of some profitable sale, purchase, or contract, or gratuity of any kind, by reason of, or in acknowledgment for, or in connection with, the making of such contract, or the transacting such business, shall be imprisoned not less than thirty-one days nor more than one year, or fined not more than three hundred dollars, or both.—*1886, Chap. 53.*

Furnishing Supplies by Officer or Trustee When Prohibited.

Sec. 1568. Every person who, being a trustee, or officer, of any institution receiving aid from the State, shall furnish supplies, or be interested in any contract for furnishing supplies to such institution, unless he be the lowest bidder for such supplies, or for such contract, after open competition, shall be fined fifty dollars.—*1886, Chap. 144.*

Justices of the Peace—Fees.

Sec. 3719. Justices of the Peace shall receive * * * for a hearing upon a complaint for commitment to the Connecticut Industrial School for Girls, to the State Reform School, or the temporary home for any county, two dollars; for trial of forcible entry and detainer, two dollars a day; each order of notice, mittimus, taxation of costs and certificate of the same in proceedings for commitment to said schools or homes, appointing and administering the oath to appraisers of land to be set off on execution, or of personal property attached and ordered to be sold, taking bond on the dissolution of an attachment or a judgment and record on default, confession, or nonsuit, fifty cents; each continuance twenty-five cents; for copies of records, the same as clerks of the superior court.—*1885, Chap. 63.*

Courts of Probate Shall Have Concurrent Jurisdiction in Commitments.

Sec. 488. Courts of Probate shall have concurrent jurisdiction with judges of city and police courts, and justices of the peace, in hearing and determining applications for commitments to the Connecticut Industrial School for Girls, and the temporary homes for dependent and neglected children, in the manner provided by law.—*1885, Chap. 110, Sec. 57.*

Judge of Police or City Court—Fees.

Sec. 3709. * * * The judge of a police or city court shall receive in proceedings to commit and commitment to the Connecticut Industrial School for Girls, the same fees as justices of the peace for like services. * *

Sheriffs and Other Officers—Fees.

Sec. 3729. * * * For service of a mittimus to commit to the Connecticut Industrial School for Girls, necessary expenses, and a reasonable compensation.

Estimates of State Expenses to be Made Biennially.

Sec. 379. It shall be the duty of the persons mentioned in the next section, on or before the first day of December, in the year eighteen hundred and eighty-eight and biennially thereafter, to make and transmit to the Treasurer, estimates of the amount of money required in their respective departments and offices of the State government, for the two fiscal years commencing on the first day of the following July. Such estimates shall be itemized to such an extent and in such manner as may be required by law, and by any rules, instructions, or regulations adopted by the Treasurer and Secretary.—*1884, Chap. 108; 1887, Chap. 5, Sec. 11.*

By Whom to be Made.

Sec. 380. The estimates for the different classes of expenditures shall be made as follows, to wit: * * * For the Connecticut Industrial School for Girls, by the superintendent and president of the board of directors of that institution.—*1884, Chap. 108.*

Number of Annual Reports to be Printed.

Sec. 331. The Comptroller shall annually cause to be printed, at the expense of the State, such number of copies of each of the following annual reports as is hereinafter stated: * * * of the Connecticut Industrial School for Girls, one thousand * * *

Public Acts of 1893.

CHAPTER CXXII.

An Act Concerning Appeals from Commitments of Children to Public Institutions.

Section 1. Chapter clxxi. of the public acts of 1889 is hereby amended to read as follows: An appeal shall lie from any judgment, order, or decree of a court of probate, judge of a city or police court, or justice of the peace committing any child to the Connecticut School for Boys, to the Connecticut Industrial School for Girls, or to any county home for dependent or neglected children, to the next criminal term of the court of common pleas to be held within and for the county where such judgment is rendered, but in towns of which the district court of Waterbury has appellate jurisdiction in criminal cases, such appeal shall be taken to the next criminal term of said district court, and in cases not in the jurisdiction of such court of common pleas or district court to the next criminal term of the superior court.

Sec. 2. Such appeal may be taken by any parent or guardian of the child so committed, or by the selectmen of the town in which such judgment is rendered, within twenty days thereafter; and the appellant shall enter into a recognizance, with surety, to the State, conditioned to answer to the complaint and abide the order and judgment of the court thereon.

Sec. 3. Complaints under sections 3628, 3641, and 3658 of the general statutes shall, on appeal, be tried by a jury, and such child shall be produced in court during trial and to receive final judgment, by the appellant or by the person or persons having such child in their possession or control; and the jury shall render a verdict of guilty or not guilty, or of proven or not proven, as the facts proved may warrant; and on a verdict of guilty or proven, sentence of commitment may follow as provided in said sections of the general statutes.

Approved, May 18, 1893.

CHAPTER CLXIV.

School Committee—Acting School Visitor—Public Money.

Section 1. Section 3639 of the general statutes is hereby amended to read as follows: The directors of the Connecticut Industrial School for Girls shall be the school committee of said district, and shall possess all the powers and be subject to all the duties within said district that are possessed by the school visitors in the several towns. They may appoint an acting school visitor in said district, who shall possess within said district all the powers and be subject to all the duties of similar officers appointed by school visitors. The authority of the board of school visitors of the town in which said district is situated shall extend only to the remaining portion of said town, and their returns and certificates shall include only the children of such remaining portion.

Sec. 2. Section 3640 of the general statutes is hereby amended to read as follows: The treasurer of the Connecticut Industrial School for Girls shall draw an order each year in favor of said district on the treasurer of said town, for the proportionate amount to which said district may be entitled of all moneys appropriated by law for the benefit, support, and encouragement of public schools, as is provided in respect to towns.

Approved, June 1, 1893.

CHAPTER CLXXXVIII.

Support of Girls Committed to the School.

Section 3647 of the general statutes is hereby amended to read as follows: There shall be taxed monthly in each year by the comptroller not to exceed three dollars a week for the necessary expenses of each girl committed to said school, and the superintendent shall make his bill therefor and present it to the comptroller, who, upon finding the same to be just, shall allow it, and it shall be paid from the State treasury.

Approved, June 6, 1893.

ANNUAL REPORT

OF

Connecticut

SCHOOL FOR IMBECILES

LAKEVILLE, CONN.

1895

HARTFORD, CONN.
PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY
1895

OFFICERS OF THE INSTITUTION.

President.

GEORGE B. BURRALL.

Vice-Presidents.

L. H. REID, HENRY GAY, G. W. RUSSELL.

Directors.

Gov. O. VINCENT COFFIN, *ex officio*,

GEORGE B. BURRALL,
HENRY GAY,
G. W. RUSSELL,
L. B. MORRIS,
W. W. KNIGHT,
L. H. REID.
J. C. GODDARD,
T. L. NORTON,
E. W. SPURR,
M. B. RICHARDSON,
GEORGE H. KNIGHT.

Executive Committee.

G. B. BURRALL, J. C. GODDARD, M. B. RICHARDSON.

Treasurer.

T. L. NORTON.

Secretary and Superintendent.

GEORGE H. KNIGHT, M.D.,

Auditor.

E. W. SPURR.

REPORT OF THE BOARD OF DIRECTORS.

To the General Assembly:

We hereby transmit to your honorable body the thirty-seventh annual report of the Connecticut School for Imbeciles.

The number of children connected with the institution during the year ending Oct. 1, 1894, was one hundred and fifty-five.

The number of State beneficiaries was one hundred and fourteen.

The amount received from the State for their support, including one hundred and four dollars for the care of a harmless lunatic, was fourteen thousand three hundred ninety-five dollars and two cents, as follows:

For quarter ending Sept. 30, 1893, . . .	$3,480.55
For quarter ending Dec. 31, 1893, . . .	3,587.21
For quarter ending March 31, 1894, . . .	3,620.46
For quarter ending June 30, 1894, . . .	3,706.80
Total income during the year, . . .	30,443.12

The balance of our income is derived wholly from tuitions from towns and individuals.

During the last summer, the money appropriated by the last Legislature was received, and a hospital building sixty feet long by twenty-four feet wide, consisting of two stories and a basement, has been erected.

When the question of heating the building came up, it was found that it could not be done from our present steam plant. After carefully looking into and considering a great number of low pressure self-regulating boilers, it was finally decided to purchase the Florida Heater.

This has proved to be a very satisfactory boiler, and through all the fall and winter, up to the present time, has never failed to give a good, equable temperature in all of our hospital rooms.

The building fills a long-felt need, and our wonder is that we have gotten along so many years without it.

As a Board, we would call your attention to that part of the Superintendent's report which refers to some protection from fire. As doubtless many of you know, our institution is a wooden structure, and would fall an easy prey should fire once get started in it. The institution is already connected by a six-inch main with the village water-works, which runs part way through the basement of our main building, and it seems to us imperative that steps should be taken to protect our buildings from fire, and, therefore, we respectfully ask that you will appropriate the sum of fifteen hundred dollars, or so much of it as may be necessary to thoroughly equip our buildings with stand-pipes and hose, and thus place it in our power to flood the different parts of our institution at a moment's notice.

For the Board,

GEORGE B. BURRALL, *President.*

TREASURER'S REPORT.

T. L. NORTON, *Treasurer*,
In account with CONNECTICUT SCHOOL FOR IMBECILES.

			Dr.
December, 1893, to balance as per report,			$63.29
May 30, 1894, received on State appropriation for Hospital,			2,000.00
June 29, 1894, received on State appropriation for Hospital,			2,000.00
			$4,063.29
		Cr.	
May 28, 1894, paid Beers & Trafford on Hospital,		$1,000.00	
June 20, 1894, paid Beers & Trafford on Hospital,		1,000.00	
July 27, 1893, paid Beers & Trafford on Hospital,		1,000.00	
Sept. 6, 1894, paid Beers & Trafford on Hospital,		850.00	
Sept. 18, 1894, paid J. R. Paine & Son on Hospital,		17.15	
Sept. 18, 1894, paid E. W. Spurr Co. on Hospital,		36.00	
Dec. 15, 1894, paid G. H. Knight on Hospital,		96.85	4,000.00
Balance,			$63.29

Table of expenditures is as follows:

Wages and salaries,	$11,758.37
Provisions and supplies,	13,930.13
Miscellaneous,	3,334.03
Improvements and repairs,	1,306.50
Insurance,	114.09
	$30,443.12

SUPERINTENDENT'S REPORT.

To the Directors:

I hereby submit the Thirty-seventh Annual Report of the Connecticut School for Imbeciles.

There have been connected with the school during the year ending Oct. 1, 1894, one hundred and fifty-five children. Our present number is one hundred and forty-two.

Number of State beneficiaries, one hundred and fourteen.

Of the one hundred and fifty-five children, fourteen were admitted last year, two readmitted, nine were returned to their homes, and four have died. Of these, one died of atrophy of the heart, one from double pneumonia, one from entero-colitis, and one from catalepsy.

The report of the school work is as follows:

Number attending school,		64
Reading,		41
Chart,	16	
Primer,	8	
Third Reader,	10	
Fourth Reader,	7	
Arithmetic,		39
Addition,	17	
Subtraction,	3	
Multiplication,	5	
Division,	6	
Fractions,	2	
Compound numbers,	6	
Geography,		20
Singing,		41
Writing,		40
History,		2
Language,		6

Number in Kindergarten Department,	49
Class in gifts, Nos. 1, 2, 3, and 4,	23
Class in paper-folding,	24
Class in stick laying and rings,	17
Class in weaving,	42
Class in card sewing,	42
Drawing,	12
Sewing,	21
Crocheting,	6
Knitting,	4
Outlining,	6

During the last year, with the exception of the month of August, when we had a few children sick with entero-colitis, the institution has been unusually free from sickness, and as this trouble seemed to be pretty general throughout the country at large, we felt the few cases which we had could not be due to any local cause.

The new hospital erected by you during the last summer has already proved how necessary and valuable such a building is to any institution.

Not only can our children, when sick, be cared for away from the bustle and noise of the institution, but it can be used as a quarantine station for newly admitted children.

In calling your especial attention to some of the differences which must always exist between the methods of caring for the various grades of unfortunates grouped under the general name of "the feeble-minded" and the methods used in developing their more fortunate brothers, I cannot do better than to quote largely from various papers read by me before The National Conference of Charities and Corrections.

The work of caring for feeble-minded children must of necessity be many-sided. The children, always children, no matter what the age, are usually neglected, often abandoned, always dependent.

Unlike the normal child, one of feeble mind finds his best development in an institution, for there alone can he get that

most necessary factor in the happiness and development of every human being, companionship.

The methods in use for developing to the highest possible extent, a feeble mind, too often in a feeble body as well, are the methods used in the development of a normal child, but intensified.

Example is much farther above precept with the imbecile than with his brighter brothers, and he gains from imitation and contact with his own kind that which his limited intelligence could never originate.

The instinct of protection and kindness is by no means an unusual quality in that grade of feeble-mindedness which we classify as bright imbecility, and in developing this trait by training such cases into care-takers for the smaller and more helpless children we serve the double purpose of making these dependents producers, and also of giving them the standing of useful members of the institution family.

Experience has proved beyond a doubt that the imbecile can he developed best where he can be made useful. He gains in self-respect in a position of trust, in kind if not in degree with his more fortunate brother. Out in the world the relentless force of competition would drive him to the wall and keep him there, literally a cumberer of the ground, a source of pauperism, and, if he is bright enough to be made a tool in the hands of the unscrupulous, a source of crime.

There is no market for imbecile labor outside institution walls, except in rare cases where charity and humanity induces someone to take an oversight of an individual case. No homes are opened to the abandoned imbecile.

No one is eager to adopt the burden into his own family. There is absolutely no such thing possible as the placing out of imbecile children except for gain. We must then have institutions for this class, both for their own sakes and for the sake of the community.

Although the time has come when the people of a state willingly and gladly provide institutions for the care of their feeble-minded, yet the problem is constantly presenting itself

how to make such an institution best serve the purpose for which it was established.

We think we see the most hopeful future in the adoption of the colony plan, in which the teachable imbeciles of both sexes are cared for in the main buildings, from which there is easy access to the schoolrooms. Not too far off should be other buildings which are devoted to the epileptics of both sexes. And still farther off may be buildings which shall be for the custodial cases of both sexes.

Under this system not only do we reach the imbecile class in all its various grades and give to the epileptic class the care and treatment necessary to them, but we can make use of the adult imbeciles who have been trained in the school in caring for the custodial cases. This is the most economical way, and with it we get the best results.

Under this colony plan, the child of the lowest grade, the idiot — that unfortunate often born so repulsive that even the ties of blood cannot lighten the burden to any but the mother — finds his one chance of development in the custodial department. The epileptic finds here his place, with that medical care which gives him perhaps a chance of improvement, or, lacking that, the oversight which keeps him from bodily harm, the amusement or occupation which brightens his life, and the shelter which removes him from the curiosity and the pity of his fellows.

The bright imbecile with harmless instincts or tendencies finds in this colony home a market for his labor. He is no longer a pauper, a State charge; he can at least earn his board and clothes, and he can care for and help to entertain and make happy his fellows who are less fortunate than himself.

The brightest imbecile of all, the moral imbecile who gives us many of our criminals, finds in the restraint of the institution a safeguard, a restraint usually unwillingly borne, hard to enforce, difficult to maintain wisely, but more necessary for the ultimate public good than the public has yet any conception of.

Most important of all, the outcome of the colony plan is the fact that when we have found a method which shall care for the custodial case, whom no one wants, and the epileptic, who becomes a custodial by degrees unless his disease is arrested, and the bright imbecile who can be taught to help his weaker brother, and the moral imbecile who can have the outlet of occupation and the safeguard of restraint and constant oversight, and, most necessary of all, and most difficult to procure for him and his depraved tendencies, that "charity which suffereth long and is kind"—when we have brought this about we shall have made a tremendous gain of preventing among imbeciles that disgrace to our civilization, the reproduction of their own kind.

I cannot close my report without calling your attention to the desirability of taking steps to protect our buildings from fire, and I would suggest that the coming legislature be asked to appropriate a sum of money sufficient to enable this to be done.

I wish to testify to the faithful and untiring efforts of our teachers and officers, and to express through you to all the employes my appreciation and thanks for the kindly service rendered by them to our children during the year just passed.

Respectfully submitted,

GEO. H. KNIGHT, *Supt.*

ADMISSION OF PUPILS.

Feeble-minded children, who are so peculiar or deficient in intellect as to be incapable of being educated at an ordinary school, may be admitted by the Superintendent.

The parents or next friends of those in whose behalf applications are made for admission as pupils, are expected to make answer, in writing, to such questions as the Superintendent may prescribe.

All pupils will be expected to come provided with a good supply of neat and substantial clothing, of dark color, and plainly marked with the child's full name.

There will be a vacation during the months of July and August, at which period all pupils must be removed by the parents or guardians, unless otherwise directed by the Superintendent.

In case of indigence, applications may be addressed to His Excellency the Governor, for aid from the State appropriation.

Where aid from the towns should also be afforded, application is made to the judge of probate of the district where the child resides. Blanks will be furnished on application.

Application for the admission of pupils, and all general correspondence, should be directed to Geo. H. Knight, M.D., Lakeville, Conn.

State of Connecticut.

THIRD BIENNIAL REPORT

AND

27th and 28th Annual Reports

OF THE

COMMISSIONERS OF INLAND FISHERIES

TO

His Excellency the Governor,

FOR THE FISCAL TERM ENDING SEPTEMBER 30, 1894.

HARTFORD, CONN.:
THE FOWLER & MILLER CO., PRINTERS AND BINDERS, 341 MAIN ST.
1894.

REPORT.

To His Excellency Luzon B. Morris, Governor,
and General Assembly State of Connecticut:

The statutes require the Commissioners of Inland Fisheries to make a yearly report to the Governor on or before the first day of November in each year, and in accordance with said statutes the Commissioners respectfully submit their twenty-seventh and twenty-eighth annual reports for the years 1893 and 1894, it being the third biennial report:

The labors of the Commission during the past two years have not been as satisfactory as we had hoped, for several reasons. The bills by the General Assembly granting the appropriations for shad propagation and retaining ponds were passed so late in the session of 1893 it was deemed advisable to postpone the work, or a part of it, until the present season, consequently the delay until the year 1894.

The bills as passed granted the appropriations, viz.: For the propagation of shad, $6,000; for retaining ponds, $5,000; for the distribution of trout, $6,000; and the pay and expenses of the Commission, $3,000.

ARTIFICIAL PROPAGATION.

The artificial propagation of shad is beyond any question, but the great difficulty that has presented itself appears in planting the fry in waters that will ensure their growth and safety and their return to their native element In the judgment of your Commissioners the most serious obstacle in the propagation is the increased pollution of the streams in which the fry is placed, but the young fish will be somewhat protected hereafter by placing them in retaining ponds made for that purpose until their growth will ensure them, when liberated to care for themselves, against the devouring army of other fish that are ready to make food of them. But will they return to an impure water to propagate? That is a question that will take time to determine.

RETAINING PONDS.

During the year 1893 your Commission visited the different localities to obtain a location for retaining ponds, and not finding a suitable place until the one at Joshuatown, near the line of East Haddam, town of Lyme, presented itself, there being pure water, never failing, fed by springs, plenty of land for building four ponds, with buildings already suitable for hatchery, with little expense for repairs, and a good fishery located near, where ripe shad can be taken for hatching, your Commission purchased the plant and have it fully equipped for work in the year 1895. The ponds are free from any other fish or eels, having been dredged the present season and two of them gravel bottomed; the lower one being on a level at high tide with the river, where the fry can be deposited and kept until their growth will ensure their safety when liberated against the devouring element that are ready at sight to make food of young fish. When the fish are liberated from the ponds they will be about ten miles from the mouth of the Connecticut River, and we think there will be no trouble in their working their way to the salt water at a time of high water in the month of September or October without any serious obstacles in the way for their safety.

SHAD HATCHING.

Your Commission having tried the experiment of taking ripe shad for hatching purposes, have come to the conclusion that it is not wise to establish hatcheries at any point above Rocky Hill on the Connecticut River; the low water at the season when ripe shad are wanted, the disturbing of the sediment deposit by the sailing craft both day and night, and the pollution of the river and its tributaries, are serious obstacles to the run of shad to the spawning ground, wherever it may be, above this point. The pollution of our streams is a matter of serious consideration, both as regards health and the fishery industry of Connecticut.

HATCHERIES.

The following pages will show the location of hatcheries for the years 1893 and 1894:

The hatchery at Birmingham in 1893, under the superintendence of Mr. James A. Sterling, took 7,236,000 eggs that produced 1,251,000 fry, they being planted in the Connecticut and Housatonic rivers.

In the year 1894 the hatchery at Birmingham, under the superintendence of Mr. G. B. Sterling, took 3,182,000 eggs and produced 1,267,000 fry, which were deposited in the Connecticut, Housatonic, and Little River, in Guilford.

In the season of 1894 a small hatchery containing fifteen jars was located at Rocky Hill (Dividend), under the superintendence of Mr. James A. Sterling, but owing to the low state of the water very few ripe shad were taken, resulting in only 26,000 eggs, producing 12,000 fry, which were deposited in the Connecticut River.

In the year 1894 the hatchery at Lyme (Joshuatown), under the superintendence of Mr. F. W. Alvord, took but few ripe shad, producing 291,000 eggs and hatching 253,000 fry, which were deposited in the Connecticut River. The work at this hatchery was commenced late in the season, hence the result.

The following pages will show the number of pounds, traps, gill and sweep nets, together with the number of shad caught on the coast and rivers of the State, as near as can be ascertained from reports of the fishermen for the years 1893 and 1894:

SALMON.

The salmon catch for the year 1893 is hardly worth the mention, as is also the catch of 1894. Your Commissioners have no knowledge of but one in 1893 and one in 1894 being taken. There have been deposited 107,000 fry in 1893 in the Housatonic and Connecticut Rivers and tributaries, and in 1894 25,000 in the Connecticut and Saugatuck Rivers.

LAKE TROUT.

In the year 1893 100,000 lake trout were deposited in the lakes of the State, and in 1894 the same number were deposited. The results will be shown in later years.

TROUT.

In the year 1893 the Commissioners purchased of Mr. C. W. Barnum, Lime Rock, 1,200,000 fry, and in 1894 the same number was purchased and deposited in the public streams of the State with fair results as far as can be ascertained within the short time we have had for observation. Of the number deposited 190,000 have been brown or Von Behr trout, which are a new species for this section and of which we cannot speak as intelligently as more time would warrant. In some States trout have been deposited a year old instead of the fry. Your Commissioners have some doubts about the

advisability, although it may be good policy, as there is no doubt that many of the fry are devoured by eels and other fish, when, if yearlings were deposited instead in less numbers, would produce the same or better results, and the number that would come to maturity would be materially increased. The past summer has been a very severe one. In some sections of the State the streams were completely dry, and will need restocking to keep the supply good.

ALEWIVES.

The alewive fishing industry has for the last few years been one of profit to the fishermen, and also to the class of people that use these fish for food. In the early season, March and April, hundreds of barrels of these fish are shipped to Boston and other eastern points, furnishing our Atlantic fishing fleet with bait. Many barrels are also shipped to different parts of New England and New York for food. The greater part are sold fresh until warm weather, and at a price that warrants the encouragement and protection of this industry. Many hundred barrels are salted when the weather is too warm to ship them fresh without great risk. The market for the salt fish is mostly foreign. The quality of the Connecticut River fish, the great care in salting and packing, with the long experience of the fishermen, make them rank second to none in price obtained, and they always find a ready market.

One trap at Saybrook and four at Westbrook take alewives and herring in April and May for bait, and sell mostly to some of the eastern fleet; but few barrels are salted. The fish are of mixed sizes, consequently not profitable for salting or food. The time given for catching alewives is from March 1st until May 12th.

During the season of 1893 twenty-eight permits were granted to use a two and one-half inch mesh net for taking alewives in the Connecticut River, one on the Thames and three on the coast. As no records have been kept of the catch in previous years, it is not easy to determine the increase or decrease of this industry.

In the season of 1894 forty permits were granted, an increase of six over the previous year.

The fishermen in each year are required by law to make report of their entire catch of fish to the Commissioners, and they have nearly all fulfilled the requirement, and under the system of granting permits, with certain restrictions required and protection afforded, the fishermen are well satisfied with the results.

OTHER FOOD FISH.

The scarcity of food fish other than shad, alewives, and trout is very evident, and probably for the same reason given for the decrease of shad in our rivers. Please note the following clipping from the *Hartford Post* of August 17th, which, perhaps, may throw a light upon the unexplained subject:

True Fish Story.—Park River the Scene of a Piscine Tragedy.—Thousands of Bullheads, Eels, and Suckers Die.—The Remarkable Spectacle Drew a Cloud of Witnesses.—Some Factory Must Have Let Acid Into the River.

No enthusiastic sportsman ever brought home a greater fish story to his friends than that revealed to-day when Park River yielded from its troubled deeps hundreds of fat eels, bullheads, and suckers, now to be seen floating dead upon its placid bosom above and below the Flower Street bridge.

The cause of this sudden revelation of the plump creatures which have for season after season fed upon the fertile mud of our beloved stream seems to have been a quantity of strong acid poured into the river from one of the large factories between the Capitol Avenue and Broad Street bridges. About 11.15 this morning there was a sight that would have gone straight to the heart of every voracious fish monger as it did to the scores of ragged urchins which haunt the factory locality, and who, with big sticks, clubbed the crazed and half-dead creatures jumping from the water or lying tangled in the slimy grass. Eels as long as one's arm, big, slippery fellows, darted to and fro, stung by the rank and poisonous material; suckers larger round than a span of the fingers, and great horned bullheads, died by the fifties, and are now rotting on the surface of the water under the scorching rays of an August sun.

From the factories of the Pratt & Whitney and the Pope companies a curious throng of workmen filled the long rooms of open windows, looking on a sight the like of which they had never seen during the several years of their apprenticeship. For many yards up the stream there could be seen countless numbers of scaly creatures jumping into the air, swimming frantically with heads raised high above the water, or dead along the river banks. So great was the number of dead or dying fish that the health inspector was summoned to see what could be done towards clearing the river of the mass of fish which, on decaying, will prove a menace to the health of the locality.

Inspector Darcy this afternoon took steps to have the dead fish removed.

U. S. FISH COMMISSION.

The State of Connecticut is indebted to Col. M. McDonald, U. S. Fish Commissioner at Washington, for 3,044,000 shad fry placed in the Connecticut River at Warehouse Point in May, 1894, the retaining pond not being ready to receive them. Also, for salmon and

lake trout eggs, which were hatched at Lime Rock and fry deposited in our lake waters free of expense to the State.

[Extracts from letters from Col. M. McDonald, U. S. Fish Commissioner, June 22d.]

In speaking of the planting of the fry at Warehouse Point he says: "It would have been much better to have put the fry in your retaining ponds had they been ready to receive them, and will be glad to arrange to send shad fry necessary to stock your ponds, provided you are not able to obtain them from your own locality."

[Under date of letter of August 7th.]

"I am very much interested in your work in Connecticut, wishing you abundant success in your new departure, and feeling very sure that it will be attained if the State assists you in your work."

[Under date of September 18th.]

"I am satisfied this new departure is the most important step the State has yet taken in the matter of holding the shad-fishing interest of Connecticut."

RECOMMENDATIONS.

Your Commissioners would recommend that the law regarding the distribution of trout be amended so that every applicant for trout shall be endorsed by the representatives of the city or town in which said applicant resides, as a guarantee of good faith in said applicant; the time to apply, between the 1st of March and the 1st of April of each year, the trout being delivered free except the cost of delivery and pay per diem for an attendant to see that they are safely in the hands or care of the applicant.

We would also recommend a suitable appropriation for carrying out the plans laid by your Commissioners for the propagation of shad at the hatchery and retaining pond at Joshuatown, and an appropriation for restocking the public streams of the State with trout.

CONCLUSION.

In conclusion, we wish to extend thanks to the several railroads for favors received in the transportation of fish free of expense to the State. Thanks are also due the Commissioners of the different States for copies of reports duly received; also, to U. S. Commissioner McDonald for invitation to visit the fisheries exhibit and attend the meeting of the Interstate Fish Commission at the World's Fair, Chicago, in 1893; also, to E. A. Bracket for invitation to attend the meeting of the Commissioners of New England, held in Boston in October, 1894.

JAS. A. BILL,
S. M. BRONSON,
RICHARD E. FOLLETT,
} *Commissioners.*

HARTFORD, Nov. 1, 1894.

Attest: S. M. BRONSON, *Secretary.*

Report of Hatcheries.

BIRMINGHAM HATCHERY, SEASON OF 1893.

To the Board of Fish Commissioners:

GENTLEMEN,—I respectfully submit my report of the shad hatching operations for the year 1893, at Birmingham, on the Housatonic River. We began by first clearing the hauling grounds, which took several days, as there was a high freshet in the river. We labored under difficulties owing to there being several large stones in our place for hauling, which had never given us trouble before; one of which was never removed, and damaged our net so that several times we had to retire in the early part of the evening. We commenced operations May 19th, but found few ripe shad; but they steadily increased, although bothered by illegal fishing as we have been in previous years, but were unable to detect any one in the act. Notwithstanding these difficulties, and mentioning that we took a good many bad eggs, we succeeded in taking 7,236,000 eggs, from which we obtained 1,251,000 fry. These were distributed as follows: 556,000 in the Housatonic and its tributaries, and 695,000 in the Connecticut River and its tributaries.

Respectfully submitted,

JAMES A. STERLING,
Assistant Superintendent.

BIRMINGHAM HATCHERY, SEASON OF 1894.

To the Board of Fish Commissioners:

GENTLEMEN,—I respectfully submit my report of the shad hatching, for the year 1894, on the Housatonic in Birmingham. We began fishing the night of May 14th with the river very low for that season of the year, and were having good success taking eggs until May 20th, when the river became so high from continual rains that we were obliged to give up fishing some nights altogether.

The new seine worked remarkably well, and we were fortunate in tearing but very little, owing to the river not having as many snags as usual, because we got most of them out before commencing operations.

We were troubled with poachers more than usual this year, as at times there were four or five nets between dam and bridge. They caught the large shad, and as they used a large mesh it allowed the bucks to pass through, and we caught an over supply of them every night. The water being either too cold the first of the season, or too warm the latter part, caused a good per centage of the eggs to spoil before the time for hatching. The shad began going up the river earlier than usual, and there had been a good many taken from the river previous to our commencing operations,

which prevented their being sold as readily as usual, but they were all disposed of at some price. Notwithstanding all we had to contend with, we succeeded in taking 3,182,000 eggs, from which we obtained 1,267,000 fry. These were distributed as follows: 600,000 in the Connecticut River and tributaries, 517,000 in the Housatonic River and tributaries, and 150,000 in East River at Guilford.

Respectfully submitted,

GILBERT B. STERLING,
Assistant Superintendent.

JOSHUATOWN HATCHERY, SEASON OF 1894.

To the Board of Fish Commissioners:

GENTLEMEN,—The following is my report of shad hatching operations at the Joshuatown hatchery for the year 1894:

I would like to say that owing to the delay in getting the piping laid at the hatchery, it made it late in the season before we commenced hatching, and when we did commence the weather and water were very cold; and as we caught very few shad at night, the result was not as satisfactory as I would have wished. I succeeded in taking 291,000 eggs, and hatched 253,000 fish, which were planted in the creek that empties into the Connecticut River at Joshuatown.

Respectfully submitted,

FRANK W. ALFORD,
Assistant Superintendent.

DIVIDEND HATCHERY, SEASON OF 1894.

To the Board of Fish Commissioners:

An experiment was made at Rocky Hill (Dividend) to ascertain if shad propagation could be carried on profitably at that point. The success met with was not as was anticipated. I went to Rocky Hill May 14th, and remained until July 3d. I found on my arrival that men were already at work clearing a hauling ground in the river, which took several days, after which the catch of shad was satisfactory; but as there seemed to be a scarcity of ripe shad, it did not prove a success.

Respectfully submitted,

JAMES A. STERLING,
Assistant Superintendent.

Amount of Shad Caught.

CONNECTICUT RIVER, 1893.

The following is the amount of shad caught in the spring of 1893, commencing at the mouth of the river and following north to the State line:

Samuel Sizer, Saybrook, gill net	1,100
Benj. C. Clark, Jr., Saybrook, gill net	1,000
Charles V. Miller, Lyme, gill net	1,309
William Flint, Lyme, gill net	927
O. S. Comstock, Essex, gill net	939
Horace L. Huntley, Hamburgh, gill net	802
Junius B. Anderson, Hamburgh, gill net	781
Henry Huntley, Hamburgh, gill net	100
Samuel P. Anderson, Hamburgh, seine	200
Herbert E. Banning, Brockway, seine	1 salmon 1,151
Nathan Damon, Brockway, seine	440
William Hawthorne, Brockway, seine	119
Joseph Ely, Hadlyme, seine	1,400
F. J. Mosier, Hadlyme, seine	1,098
B. B. Collins, Hadlyme, seine	400
H. S. Buckingham, Deep River, seine	711
George M. Francis, Chester, gill net and seine	1,494
John Brainard, Haddam, gill net	1,184
H. H. Clark, Haddam, gill net	787
F. D. Waterhouse, Haddam, gill net and seine	1,140
D. E. Dingwell, Higganum, gill net	1,684
Evans & Cavanaugh, Middle Haddam, gill net	317
W. R. Bulkeley, Rocky Hill, gill net	630
S. Hale & Son, Wethersfield, seine	1,465
Shad taken in nets, permits granted	2,504
Total	23,682

CONNECTICUT RIVER, 1894.

The following is the amount of shad caught in the spring of 1894, commencing at the mouth of the river and following north to State line:

Samuel Sizer, Old Saybrook, gill net	1,074
Benj. C. Clark, Jr., Old Saybrook, gill net	1,142
C. V. Miler, Lyme, gill net	1,036
William E. Bates, Lyme, gill net	1,083
William H. Flint, Lyme, gill net	646

O. S. Comstock, Essex, gill net	1,174
Henry Huntley, Hamburgh, gill net	654
C. F. and F. N. Hull, Hamburgh, gill net	1,044
H. D. Huntley, Hamburgh, gill net	748
S. P. Anderson, Hamburgh, gill net	60
Arthur Peckham, Brockway, gill net	711
Nathan Damon, Brockway, gill net	870
Jared Daniels, Brockway, gill net	512
Herbert E. Banning, Brockway, gill net	1,493
James Miller, Brockway, gill net	1 salmon 870
H. S. Buckingham, Deep River, gill net	1,017
George C. Francis, Chester, gill net	905
William E. Anderson, Chester, gill net	236
E. M. Phelps, Hadlyme, gill net	495
Elliott W. Ely, Hadlyme, seine	4,008
McDonald & Cone, Hadlyme, gill net	791
Alden S. Cone, Hadlyme, gill net	1,519
J. N. Ely & Co., Hadlyme, gill net	1,150
W. F. Harrison, Hadlyme, gill net	553
H. C. Burnham, Hadlyme, gill net	33
Edward Simpson, Hadlyme, gill net	915
J. H. Ely, Hadlyme, 2 gill nets	2,191
George E. Russell, Haddam, 2 gill nets	372
David E. Dingwell, Haddam, 2 gill nets	1,241
H. E. May, Higganum, 2 gill nets	839
Ira G. Bailey, Higganum, 2 gill nets	600
F. Chittenden & Son, Higganum, 2 gill nets	1,138
Chalker & Spencer, Higganum, 2 gill nets	856
F. O. Tyler, Shailorville, 2 gill nets	1,735
W. H. Arnold, Shailorville, gill net and seine	754
J. O. Brainard, Shailorville, gill net	1,039
W. H. Arnold, Tylerville, gill net and seine	764
H. H. Clarke, Tylerville, gill net	741
T. M. Cavanaugh, Middle Haddam, gill net	491
Buttons & Walker, Portland, gill net	68
L. Hale & Son, Wethersfield, seine	1,208
Shad taken in nets, permits granted	5,724
Total	44,500

HOUSATONIC RIVER, 1893.

The following is the amount of shad caught on the Housatonic River in the spring of 1893:

John Blakeslee, Stratford, gill net and seine	276
John Benson, Birmingham, gill net	18
Arthur R. Blakeslee, Birmingham, gill net	117
Nathan W. Clark, Stratford, gill net	1,141

C. C. Ford, Milford, gill net	493
H. S. Moulthrop, Birmingham, gill net	100
Jeremiah Parker, Oronoque, gill net	337
James Peet, Stratford, 2 gill nets	853
Charles L. Plumb, Jr., Stratford, 2 gill nets	657
Rowen & Bond, Milford, 2 gill nets	307
State hatchery, Birmingham, seine	2,468
Levi Slie & Son, Birmingham, seine and gill net	800
Charles F. Weed, Oronoque, 2 gill nets	362
Samuel N. Welles, Stratford, gill net	1,000
E. N. Wakeley, Stratford, gill net and seine	1,649
Total	10,578

SUMMARY.

SHAD CATCH, 1893.

Number of shad caught in pounds	6,393
Number of shad caught on Connecticut River in gill nets and seines,	21,778
Number of shad caught on Housatonic River in gill nets and seines,	10,558
	38,749
Number of shad caught in nets, permits granted 2½ and 5½ mesh,	2,504
Total	41,253

This does not include shad taken for hatching.

SHAD CATCH, 1894.

Number of shad caught in pounds	3,166
Number of shad caught in gill nets and seines	38,776
Number of shad caught on Housatonic River in gill nets and seines,	24,732
Shad taken in nets, permits granted, 2½ and 5½ mesh	5,724
Total	72,398

These figures do not include the shad taken for hatching.

RETURNS OF POUNDS AND TRAPS FOR THE YEAR OF 1893, COMMENCING AT STONINGTON ON THE EAST AND EXTENDING TO MILFORD ON THE WEST.

PROPRIETOR AND TOWN.	No. of Traps and Pounds.	Shad.	Salmon.	Striped Bass.	Black Bass.	Sea Bass.	Black Fish.	Weak Fish.	Butter Fish.	Flat Fish.	Scup.	Porgies.	Flounders.	Sturgeon.	Alewives.	Flukes.	Other Fish.
F. N. Burdick, Stonington	4	.....	...	26	.....	.....	324	647	15 bbls.	.....	.....	.....	80 bbls.	.....	3,175	580	.....
Fred. Ostman, Stonington	6	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*a* 112bls.
G. W. Wilcox, Mystic	2	.....	...	.....	.....	.....	.....	3½ bbls.	.....	18 bbls.	.....	.....	16 bbls.	.....	.....	.....	.....
D. E. Wilcox, Mystic	1	.....	...	.....	.....	.....	.....	1 bbl.	.....	26 bbls.	.....	1½bbls.	12½bbls	.....	.....	.....	.....
R. F. Chapman, Mystic	2	.....	...	.....	.....	.....	185 lbs.	7 bbls.	.....	28 bbls.	.....	.....	.....	.....	.....	.....	.....
Moses H. Wilcox, Mystic	4	4	...	9	.....	.....	12½bbls	5½bbls.	.....	.....	.....	.....	158½bls	.....	.....	.....	14½ bls.
S. M. Coles, Noank	2	19	...	131	.....	72	1,837	845	.....	.....	.....	.....	22 bbls.	.....	7,945	.....	.....
E. M. Ashley, Noank	3	.....	...	.....	.....	.....	.....	623 lbs.	.....	.....	135 lbs.	.....	1377 lbs.	.....	.....	535 lbs.	.....
John S. Latham, Noank	1	6	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*b* 3620lbs
J. H. Wells, Poquonock Bridge,	1	.....	...	22	.....	107	.....	74	.....	.....	.....	77	.....	.....	.....	.....	.....
R. C. Bogue, Poquonock Bridge,	2	.....	...	110 lbs.	.....	1,800	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	*b* 1375
Amos Bunnell, Poquon'k Bridge	1	.....	...	.....	.....	.....	50 lbs.	.....	450 lbs.	.....	.....	.....	1250 lbs.	.....	.....	.....	*c* 40 bbls
John M. Chapman, Groton	1	.....	...	116	.....	.....	97	593	.....	.....	.....	.....	.....	.....	.....	.....	.....
R. W. Gavitt, Waterford	3	1	...	.....	.....	53 lbs.	345 lbs.	167 lbs.	180 lbs.	.....	.....	.....	1130 lbs.	.....	.....	.....	.....
A. L. Sherman, Niantic	4	8	...	.....	.....	.....	.....	.....	8 bbls.	13 bbls.	.....	.....	19 bbls.	.....	15,200	.....	.....
James P. Clark, Niantic	6	10	...	140	.....	.....	8 bbls.	.....	.....	.....	.....	.....	.....	.....	.....	.....	*d* 145 bls.
James M. Raymond, Niantic	8	.....	...	157 lbs.	10 bbls.	.....	.....	4 bbls.	.....	.....	.....	.....	.....	.....	.....	.....	*e* 71 bls.
E. W. Cook, Niantic	2	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*c* 11½ bs
John F. Bushnell, O. Saybrook,	2	2,491	...	2	.....	.....	15	.....	.....	.....	.....	.....	.....	.....	52,520	.....	.....
George C. Ingham, O.Saybrook,	1	1,493	...	.....	20	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R. H. Stannard & Bro.,Westb'k,	2	375	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49,722	.....	*b* 55½ bs
Dibble, Hayden & Co.,Westb'k,	1	373	...	.....	.....	.....	61	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charles H. Hurd, Clinton	1	124	...	.....	.....	.....	200	450	.....	2,000	.....	.....	.....	.....	.....	.....	.....
Zial Stannard, Clinton	1	203	1	9	.....	.....	129	29	.....	1,435	.....	.....	1,880	.....	17,550	.....	.....
E. A. Dowd, Madison	2	226	...	.....	.....	13	114	480	10 bbls.	.....	.....	.....	5 bbls.	2,400	.....	.....	.....
E. B. Field, East River	1	10	...	.....	.....	.....	40 lbs.	30 lbs.	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. T. Dolph, Guilford	1	41	...	.....	114	.....	.....	182	.....	264	.....	.....	.....	.....	.....	.....	.....
R. B. Hill, Guilford	1	55	...	.....	.....	.....	45	21	.....	.....	.....	.....	.....	.....	.....	.....	.....
Levi Thrall, Guilford	1	54	...	.....	.....	.....	50	61	.....	.....	.....	.....	.....	.....	.....	.....	.....
F. E. Smith, Stony Creek	1	142	...	.....	.....	.....	209 lbs.	237 lbs.	415 lbs.	.....	.....	.....	1011 lbs.	.....	.....	.....	.....
John R. Tyler, Branford	1	83	...	.....	.....	.....	.....	165	.....	.....	.....	.....	395	.....	.....	.....	.....
Edward R. Kelsey, Branford	3	398	...	.....	.....	.....	128 lbs.	1,394	1,297	560 lbs.	.....	.....	.....	359	.....	.....	.....
C. G. Kimberly, New Haven	1	126	...	.....	.....	.....	164 lbs.	235 lbs.	407	.....	.....	.....	1194 lbs.	.....	.....	.....	.....
A. W. Burns, Milford	1	150	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		6,393															

a Flat fish, black fish, and flounders. *b* Flat fish and flounders. *c* Mixed. *d* Flat fish, weak fish, and flounders. *e* Flukes, flat fish, and flounders.

RETURNS OF POUNDS AND TRAPS FOR 1894, COMMENCING AT STONINGTON ON THE EAST AND EXTENDING TO MILFORD ON THE WEST.

PROPRIETOR AND TOWN.	Nos. of Traps and Pounds.	Shad.	Salmon.	Striped Bass.	Black Bass.	Sea Bass.	Black Fish.	Weak Fish.	Butter Fish.	Flat Fish.	Scup.	Porgies.	Flounders.	Sturgeon.	Alewives.	Flukes.	Other Fish.
F. N. Burdick, Stonington	4	8				694 lbs.	1,400	737	16 bbls.	38½bls.		10bbls				45½bbls	2,400 herrings.
James Thompson, Stonington	3																100 bls.tom cods 40 smelts.
Fred. Ostman, Stonington	1	9															282 bait fish.
C. H. Noyes, Mystic	1						2½bbls.	5 bbls.		9½			8½bbls.				3½ herrings.
D. E. & G. W. Wilcox, Mystic,	2						7	40		18		62					
R. Y. Chapman, Mystic	2							11									*a* 29½
M. H. Wilcox, Mystic	3					2 bbls.	17	22½		53½			6½				24 herrings.
John S. Latham, Noank	6						69	229		1,655							875 squids.
E. M. Ashley, Noank	1						133	655 lbs.			573lbs						37 lbs. blue fish.
E. M. Ashley, Noank	2						113	701		1637 lbs	25					483 lbs.	1,342 mixed.
S. M. Cole, Noank	1	6		1.705	1,195	68		1,967		1,915			2,988				15 bbls. squids.
S. M. Cole, Noank	1	10				36	832	115					1,150				6,615 herrings. 19 bbls. squids.
Edwin Hewlett, Poquo. Bridge,	2						230	316			308		551				
Amos Bunnell, Poquo. Bridge	1	1		85			300	2,700					4,300				
R. C. Bogue, Poquo. Bridge	2						1,320	795	2,360 lbs.								
J. H. Wells, Poquo. Bridge	1	5					134	273	614				302				
William Spicer, Groton	1			47				284									
John M. Chapman, Groton	1						215			306			114				
R. W. Gavitt, Waterford	3	2					438	642					1888 lbs				875 herrings.
James M. Raymond, Niantic	7	5					14 bbls.	27 bbls.								42 bbls.	
E. W. Cook, Niantic	2																15 bbls. mixed.
James P. Clark, Niantic	7	95				55	27	25					98 bbls.				*b* 50
A. L. Sherman, Niantic	4	18					2	12	9 bbls.				15				16,000 herrings.
J. F. Bushnell, Saybrook	2	1,648		10			13	80		9000 lbs					62,388		
D. C. Dibble, Westbrook	1	53					19	21							14,716		
Dibble, Hayden & Co., Westb'k,	1	166					41	20							23,050		
Zial Stannard, Westbrook	1	217					78	52		3,040			554		16,235		
R. H. Stannard & Bro., Westb'k,	2	331					343	67	379	15,410			51		36,895		175,000whitefish
Charles H. Hurd, Clinton	1	28					65	290									
E. B. Field, Madison	1	25					100	100									
E. A. Dowd, Madison	2	257					104	392		2 bbls.				2,500			
P. M. Blachley, East River	1	63								2550 lbs							
R. E. Bassett, East River	1	20					4	20									
S. T. Dolph & Co., Guilford	1	3					68	106									
Royal B. Hill, Guilford	1	3					10	38									
Kimberly & Smith, Stony Creek	2	117					301	222					159				
E. R. Kilsey, Branford	3	73					578 lbs.	2,979 lbs.	155								
John R. Tyler, Branford	1	3						1,318					14				
		3,166															

a Flounders and flukes. *b* Herrings and squids.

Pounds and Traps.

1893.

The following is a record of pounds and traps, with the numbers and names of applicants, for the year 1893:

No.

1. Wm. Spicer Groton, off Spicer Point, Groton.
2. J. S. Latham, Noank, southwest point Ram Island.
3. Fred. Ostman, Stonington, off southwest Rip Rap.
4. F. H. Beckwith, New London, east side Black Point Bay.
5. F. H. Beckwith, New London, off Goshen Point, west side harbor.
6. Fred. Ostman, Stonington, west side Stonington Point.
7. Fred. Ostman, Stonington, east side Stonington Point.
8. E. W. Cook, Niantic, east side Niantic Bay.
9. E. W. Cook, Niantic, east side Niantic Bay.
10. J. H. Wells, Poquonock Bridge, east end Poquonock Beach.
11. E. M. Ashley, Noank, west Mason's Island.
12. Samuel M. Cole, Noank, off Lydia Island.
13. Samuel M. Cole, Noank, off Long Point.
14. J. S. Latham, Noank, southwest point Ram Island.
15. J. S. Latham, Noank, northeast point Ram Island, outer Hammock.
16. J. S. Latham, Noank, east side Ram Island, outer Hammock.
17. J. S. Latham, Noank, on flats northwest outer Hammock.
18. J. S. Latham, Noank, middle Ram Island, Bay side.
19. Jas. M. Raymond, Niantic, north side Niantic Bay.
20. Jas. P. Clark, East Marion, L. I., off Millstone Point, Waterford.
21. Jas. P. Clark, East Marion, L. I., southeast Goose Island.
22. Jas. P. Clark, East Marion, L. I., off Robert Payne's shore.
23. Jas. M. Raymond, Niantic, off Bloody Point.
24. Jas. M. Raymond, Niantic, off Bloody Point.
25. Jas. P. Clark, East Marion, L. I., east line of F. Nicoll, Waterford.
26. Jno. M. Chapman, Groton, off Eastern Point.
28. A. L. Sherman, Niantic, west side Black Point.
29. A. L. Sherman, Niantic, west side Luce fishworks.
30. A. L. Sherman, Niantic, off Beckwith Neck.
31. A. L. Sherman, Niantic, off Hatchett's Point.
32. F. H. Beckwith, New London Harbor.
33. J. M. Raymond, Niantic, off Champlin Point.
34. J. M. Raymond, Niantic, off Champlin Point.
35. F. H. Beckwith, New London, southeast Black Point.
36. E. A. Dowd, Madison, in Bay off West Wharf.
37. E. A. Dowd, Madison, in Bay off West Wharf.

38. R. W. Gavitt, Waterford, near Millstone Point.
39. R. W. Gavitt, Waterford, continuation outside.
40. R. W. Gavitt, Waterford, seventy-five rods south of the two.
41. Jas. P. Clark, East Marion, L. I., off Crescent Beach.
42. Jas. P. Clark, East Marion, L. I., 300 feet same line out.
43. R. C. Bogue, Poquonock Bridge, east New London Lighthouse.
44. R. C. Bogue, Poquonock Bridge, off Pine Island, southeast New London Lighthouse.
45. Fred. Ostman, Stonington, Little Narragansett Bay.
46. F. N. Burdick, Westerly, R. I., Pawcatuck River.
47. F. N. Burdick, Westerly, R. I., Pawcatuck River.
48. F. N. Burdick, Westerly, R. I., southeast Stonington.
52. E. M. Ashley, Noank, south side Dodge Island.
53. M. H. Wilcox, Mystic, southwest Woodbridge Island.
54. F. H. Beckwith, New London, west side Black Point.
55. R. T. Chapman, Mystic, off southwest point Edwards Island.
56. R. T. Chapman, Mystic, east side Mason's Island, opposite fishworks.
60. M. H. Wilcox, Mystic, east Lydia Island.
61. Geo. W. Wilcox, Mystic, off Cedar Point.
62. Geo. W. Wilcox, Mystic, east Baker's Island.
64. M. H. Wilcox, Mystic, southeast Convent Rocks.
65. Fred. Ostman, Stonington, southwest Whamphannock Point.
66. Fred. Ostman, Stonington, east side Whamphannock Point.
67. E. M. Ashley, Noank, east side Dodge Island.
68. Jas. Thompson, Westerly, east end Osbrooke Point.
69. Jas. Thompson, Westerly, southeast Edwards Island.
70. Jas. Thompson, Westerly, southeast Edwards Island.
72. Richard H. Stannard & Bro., Westbrook, off Money Point.
73 Jno. F. Bushnell, Old Saybrook, next west Lighthouse.
74. Jno. F. Bushnell, Old Saybrook, second west Lighthouse.
75. Richard H. Stannard & Bro., Westbrook, west end Stannard's Beach.
80. Geo. C. Ingham, Old Saybrook, Guard House Point.
81. E. R. Kelsey, Branford, off Cow and Calf Rocks.
82. E. R. Kelsey, Branford, off Darrow's Island.
83. E. R. Kelsey, Branford, off Guinon Reef.
84. Fred. Ostman, Stonington, off Nate's Point, east side Stonington harbor.
85. Ed. P. Clark, Stonington, west end railroad bridge, south side harbor.
86. Jno. Robbins, Black Hall, off Bond Beach, Niantic.
87. Ed. P. Clark, Stonington, watering place fence, west side.
88. Levi Thrall, Guilford, west of round house.
89. F. N. Burdick, Westerly, off Barn Island, Stonington.
90. Jno. R. Tyler, Branford, Indian Neck, near Hammock Point.
91. Jas. M. Raymond, Niantic, south Wigwam Rock, Niantic Bay.
92. M. H. Wilcox, Mystic, at Noyes Rocks, Fisher's Island Sound.
93. Geo. W. Wilcox, Mystic, southeast Andrews Island.
94. R. E. Bassett, East River, west boundary Madison line.
95. E. B. Field, East River, west boundary Madison line.

96. F. E. Smith, Stony Creek, south Little Pumpkin Island.
97. Chas. G. Kimberly, New Haven, south Little Pumpkin Island.
98. Amos Bunnell, Poquonock Bridge, midway Poquonock Beach.
99. Ralph B. Hill, Guilford, south Guilford Point.
100. Jas. M. Raymond, Niantic, off Bloody Point.
101. Jas. M. Raymond, Niantic, south Wigwam Rock.
102. Charles H. Eccleston, Jr., Mystic, Mystic Island Bay.
103 S. G. Dolph, Guilford, at Riding Rock grounds.
104. Dibble, Hayden & Co., Westbrook, end Grove Beach.
105. D. E. Wilcox, Mystic, southwest Screecher's Rocks, Fisher's Island Sound.
106. D. E. Wilcox, Mystic, continuation of last number.
107. Zial Stannard, Clinton, west Munketesuck Point.
108. Chas. H. Hurd, Clinton, west side Clinton harbor, off Munketesuck Point.

1894.

The following is a record of pounds and traps, with the numbers and names of applicants, for the year 1894:

No.

1. Wm. Spicer, Groton, off Spicer's Point, Groton.
2. J. S. Latham, Noank, southwest point Ram Island.
3. Fred. Ostman, Stonington, off southwest Rip Rap.
4. F. H. Beckwith, New London, east side Black Point Bay.
5. F. H. Beckwith, New London, off Goshen Point, west side harbor.
6. Fred. Ostman, Stonington, west side Stonington Point.
7. Fred. Ostman, Stonington, east side Stonington Point.
8. E. W. Cook, Niantic, east side Niantic Bay.
9. E. W. Cook, Niantic, east side Niantic Bay.
10. J. W. Wells, Poquonock Bridge, east end Poquonock Beach.
11. E. M. Ashley, Noank, west Mason's Island.
12. Samuel M. Cole, Noank, off Long Point.
13. Samuel M. Cole, Noank, off Lydia Island.
14. J. S. Latham, Noank, southwest point Ram Island.
15. J. S. Latham, Noank, northeast point Ram Island.
16. J. S. Latham, Noank, east side Ram Island.
17. J. S. Latham, Noank, on flats northeast Ram Island.
18. J. S. Latham, Noank, middle Ram Island, Bay side.
19. J. M. Raymond, Niantic, north side Niantic Bay.
20. J. P. Clark, East Marion, L. I., off north point Waterford.
21. J. P. Clark, East Marion, L. I., southeast Goose Island.
22. J. P. Clark, East Marion, L. I , off Robert Payne's shore.
23. J. M. Raymond, Niantic, off Bloody Point.
24. Maltby Gelston, East Haddam Pond.
25. Jas. P. Clark, East Marion, L. I., east line of F. Nicoll, Waterford.
26. Jno. F. Chapman, Groton, off Eastern Point.
27. Maltby Gelston, East Haddam Pond.
28. A. L. Sherman, Niantic, west side Black Point.

29. A. L. Sherman, Niantic, west Luce fishworks.
30. A. L. Sherman, Niantic, off Beckwith Neck.
31. A. L. Sherman, Niantic, off Hatchett's Point.
32. F. H. Beckwith, New London.
33. J. M. Raymond, Niantic, oft Champlin Point.
34. J. M. Raymond, Niantic, off Champlin Point.
35. F. H. Beckwith, New London, southeast R. R. Point.
36. E. A. Dowd, Madison, in Bay off east wharf.
37. E. A. Dowd, Madison, in Bay off east wharf.
38. R. W. Gavitt, Waterford, near Millstone Point.
39. R. W. Gavitt, Waterford, continuing outside.
40. R. W. Gavitt, Waterford, seventy-five rods southeast of the two.
41. Jas. P. Clark, East Marion, L. I., off Crescent Beach.
42. Jas. P. Clark, East Marion, L. I., same line 300 feet farther out.
43. R. C. Bogue, Poquonock Bridge, east New London Lighthouse.
44. R. C. Bogue, Poquonock Bridge, off Pine Island, southeast New London Lighthouse.
45. Fred. Ostman, Stonington, Little Narragansett Bay.
46. F. A. Burdick, Westerly, Pawcatuck River.
47. F A. Burdick, Westerly, Pawcatuck River.
48. F. A. Burdick, Westerly, breakwater southeast Stonington.
49. Edwin Hewlett, Poquonock Bridge, northwest point Pine Island.
50. Edwin Hewlett, Poquonock Bridge, east of Latham Chase.
51. Edwin Crittenden, Niantic, near Pond's Reef.
52. E. M. Ashley, Noank, south side Dodge Island.
53. M. H. Wilcox, Mystic, southwest Woodbridge Island.
54. F. H. Beckwith, New London, west side Black Point.
55. R. T. Chapman, Mystic, southwest point Andrews Island.
56. R. T. Chapman, Mystic, east side Mason's Island.
58. D. C. Dibble, Westbrook, Lewis Bay, west fishery.
59. T. M. Blackley, East River, Rogers Island, in Branford.
60. M. H. Wilcox, Mystic, east Lydia Island.
61. T. D. Babcock, Westerly, at Narrows, Pawcatuck River.
62. T. D. Babcock, Westerly, Stanton or Barn Island.
63. T. D. Babcock, Westerly, Pawcatuck Bay.
64. M. H. Wilcox, Mystic, southeast Convent Rocks.
65. Fred. Ostman, Stonington, southwest Whamphannock Point.
66. Fred. Ostman, Stonington, east side Whamphannock Point.
67. C. Henry Noyes, Mystic, east side Dodge Island.
68. Jas. Thompson, Westerly, west end Osbrooke Point.
69. Jas. Thompson, Westerly, southeast Edwards Island.
70. Jas. Thompson, Westerly, southeast Edwards Island.
71. Wm. P. Lathan, Noank, west end Ram Point, Mystic River.
72. R. H. Stannard & Bro., Westbrook, off Money Point.
73. Jno. F. Bushnell, Old Saybrook, next west Lighthouse.
74. Jno. F. Bushnell, Old Saybrook, second west Lighthouse.
75. R. H. Stannard & Bro., Westbrook, west end Stannard's Beach.
80. Geo. C. Ingham, Old Saybrook, Guard House Point.

81. E. R. Kelsey, Branford, off Cow and Calf Rocks.
82. E. R. Kelsey, Branford, off Darrows Island.
83. E. R. Kelsey, Branford, off Guinon Reef.
84. Fred. Ostman, Stonington, off Nate's Point.
85. E. P. Clark, Stonington, west end railroad bridge.
86. Wm. P. Lathan, Noank, east side Turner's Reef.
87. E. P. Clark, Stonington, watering place fence, west side.
88. R. P. Hill, Guilford, south Guilford Point.
89. F. A. Burdick, Westerly, off Barn Island.
90. Jno. R. Tyler, Branford, Indian Neck, near Hammock Point.
91. J. M. Raymond, Niantic, south Wigwam Rock, Niantic Bay.
92. M. H. Wilcox, Mystic, southeast Andrews Island.
94. R. E. Bassett, East River, west boundary Madison line.
95. E. B. Field, East River, west Island.
96. Kimberly & Smith, Stony Creek, south Little Pumpkin Island.
97. Kimberly & Smith, Stony Creek, both in Branford.
98. Amos Bunnell, Poquonock Bridge, midway Poquonock Beach.
99. R. W. Gavitt, Waterford, near Pleasant Beach.
100. J. M. Raymond, Niantic, off Bloody Point.
101. J. M. Raymond, Niantic, south Wigwam Rock.
102. E. H. Eccleston, Jr., Mystic, Mystic Island Bay.
103. L. T. Dolph, Guilford, at Riding Rock grounds.
104. Dibble, Hayden & Co., Westbrook, west end Grove Beach.
105. D. E. & G. W. Wilcox, Mystic, southwest Screecher's Rock, Fisher's Island Sound.
106. D. E. & G. W. Wilcox, Mystic, continuation of 105.
107. Zial Stannard, Westbrook, west of Clinton's first place.
108. Chas. H. Hurd, Clinton, west side harbor, off Hammock Point.

Financial Statement.

APPROPRIATIONS.

Shad appropriation, ending September 30, 1894		$6,000 00
Amount expended September 30, 1893		1,217 64
Expenditure for 1894		$4,782 36
Expenses shad hatchery, Birmingham	$713 73	
Expenses shad hatchery, Joshuatown	423 82	
Expenses shad hatchery, Rocky Hill	671 11	
Repairing hatchery Joshuatown, and fixtures for same,	430 00	
Material and labor on upper dams and flumes	285 64	
		2,524 30
In treasury		$2,258 06

AMOUNT FOR TWO YEARS.

Trout appropriation ending September 30, 1894			$6,000 00
1893.			
May 20.	Check to C. W. Barnum, 600,000 fry	$1,500 00	
June 21.	Check to C. W. Barnum, 600,000 fry	1,500 00	
			3,000 00
1894.			$3,000 00
April 14.	Check to C. W. Barnum, 400,000 fry	$1,000 00	
May 10.	Check to C. W. Barnum, 400,000 fry	1,000 00	
Sept. 12.	Check to C. W. Barnum, 400,000 fry	1,000 00	
			3,000 00
			$6,000 00

APPROPRIATION FOR THE PURCHASE OF A PLANT AND THE CONSTRUCTION OF RETAINING PONDS FOR YOUNG SHAD AND SALMON, YEAR OF 1894.

Purchase of a plant	$829 25
Timber, lumber, lime, tools, labor, etc	4,170 75
Total	$5,000 00

SERVICES AND EXPENSES.

Appropriation for services and expenses of commissions, ending September 30, 1894		$3,000 00
Amount drawn by Commissioners, September 30, 1893,	$1,709 76	
Amount drawn by Commissioners, September 30, 1894,	1,241 99	
		2,951 75
Amount in treasury		$48 25

Drawn by the old Board out of the 1893 appropriation —

By J. A. Bill, services and expenses from June 30, 1891, to June 30, 1892	$197 55
By R. B. Chalker, services and expenses from close of year to March 1, 1893	145 70
By W. S. Downs, order of Governor M. G. Bulkeley	421 45
Total amount	$764 70

This amount was charged to appropriation for expenses of Commissioners for 1893 and 1894.

STATEMENT OF EGGS TAKEN, ETC., AT BIRMINGHAM, FOR HATCHING, 1893.

1893.	Degrees of Temperature of Water.		Number of Eggs Taken.	Number of Fish Planted.
	Morning.	Evening.		
May 16	60	60	.....	.....
17	58	62	.....	.....
18	56	58	.....	.....
19	60	58	1,200	.....
20	62	62	7,000	.....
21	64	64	162,000	.....
22	64	62	56,000	.....
23	68	66	28,000	.....
24	70	69	28,000	.....
25	70	72	.....	.....
26	69	69	56,000	.....
27	68	68	.....	17,000
28	66	64	56,000	.....
29	64	62	45,000	.....
30	64	64	91,000	.....
31	64	62	70,000	94,000
June 1	66	70	70,000	.....
2	66	66	30,000	.....
3	67	66	.....	85,000
4	70	68	70,000	.....
5	72	74	90,000	.....
6	76	74	50,000	160,000
7	74	72	42,000	.....
8	74	74	99,000	125,000
9	72	71	180,000	.....
10	73	72	.....	70,000
11	75	74	190,000	.....
12	77	76	25,000	.....
13	77	77	35,000	.....
14	76	75	40,000	165,000
15	76	76	100,000	.....
16	75	75	15,000	.....
17	74	74	.....	.....
18	75	74	45,000	.....
19	73	70	40,000	85,000
20	76	78	12,000	.....
21	78	78	21,000	150,000
22	78	76	35,000	.....
23	76	76	25,000	100,000
24	73	72	.....	.....
25	73	70	10,000	.....
26	76	76	10,000	.....
27	78	80	.....	100,000
28	79	80	.....	100,000
			7,236,000	1,251,000

JAS. A. STERLING, *Assistant Superintendent.*

STATEMENT OF EGGS TAKEN, ETC., AT BIRMINGHAM, FOR HATCHING, 1894.

1894.	Degrees of Temperature of Water.		Number of Eggs Taken.	Number of Fry Planted.
	Morning.	Evening.		
May 14	67	68	250,000	.....
15	68	66	112,000	.....
16	66	64	135,000	.....
17	64	64	168,000	.....
18	64	63	100,000	.....
19	64	65	.....	.....
20	65	66	.....	.....
21	61	60	.....	.....
22	59	60	.....	100,000
23	60	58	16,000	.....
24	62	63	.....	.....
25	61	61	.....	165,000
26	61	62	.....	.....
27	63	64	21,000	.....
28	64	65	65,000	100,000
29	66	66	95,000	.....
30	64	62	40,000	.....
31	62	61	40,000	10,000
June 1	61	60	42,000	24,000
2	61	61	.....	.....
3	62	60	30,000	.....
4	64	63	100,000	.....
5	65	66	195,000	.....
6	64	66	120,000	.....
7	63	63	30,000	.....
8	62	61	256,000	.....
9	61	66	.....	165,000
10	66	70	195,000	.....
11	66	74	100,000	.....
12	70	72	50,000	85,000
13	72	73	168,000	.....
14	72	75	86,000	215,000
15	73	74	200,000	.....
16	72	74	.....	110,000
17	75	78	145,000	.....
18	77	78	120,000	15,000
19	78	79	50,000	160,000
20	78	80	28,000	28,000
21	78	79	50,000	.....
22	80	81	21,000	30,000
23	82	82	.....	.....
24	82	78	7,000	.....
25	78	78	40,000	20,000
26	77	78	7,000	40,000
27	77	76	.....	.....
			3,182,000	1,267,000

GILBERT B. STERLING, *Assistant Superintendent.*

SHAD CAUGHT AT DIVIDEND, BY A. F. TAYLOR, FOR HATCHERY, 1894.

Date.	Shad.	Fry.	Eggs.	Date.	Shad.	Fry.	Eggs.
May 14	1	....	....	June 9	42	....	....
May 15	11	....	....	June 11	41	....	....
May 16	....	....	....	June 12	15	....	....
May 17	10	....	....	June 13	63	26,000	..
May 18	32	....	....	June 14	87	....	....
May 19	16	....	....	June 15	23	....	....
May 21	13	....	....	June 16	25	....	....
May 22	9	....	....	June 18	53	....	....
May 23	....	....	....	June 19	37	....	....
May 24	....	....	....	June 20	45	....	....
May 25	....	....	....	June 21	6	....	....
May 26	1	....	....	June 22	*4	....	30,000
May 28	29	....	....	June 23	24	....	....
May 29	5	....	....	June 25	6	....	....
May 30	....	.. .	....	June 26	7	.. .	....
May 31	11	....	....	June 27	3	....	....
June 1	64	....	....	June 28	10	....	....
June 2	90	....	....	June 29	1	....	....
June 4	102	....	....	June 30	8	....	....
June 5	32	....	....	July 2	6	....	....
June 6	26	....	....	July 3	*10	....	50,000
June 7	27	....	....				
June 8	117	....	40,000		1,112	26,000	120,000

*No Bucks.

JAMES A. STERLING,
Assistant Superintendent.

ALEWIVES—PERMITS GRANTED, AND CATCH OF 1893.

Permit No.	Location.	Fishermen or Owners.	Shad Caught.	Alewives, Fresh. Dozens.	Alewives, Salt in Barrels.	Other Food Fish. Pounds.	Remarks.
1	Warehouse Point	A. Smith		1,000			
2	Hartford	H. E. Kilby					No report.
3	Glastonbury	D. L. Talcott	2	1,500		100	
4	Warehouse Point	J. W White		4,000			
5	Gildersleeve	A. T. Taylor	64	823			Seine and gill net.
6	Hockanum	Fox Bros		1,000	996		
7	Naubuc	Twillcott & Sons	4	1,200	800		
8	Dividend	C. E. Billings		50			
9	Cromwell	L. H. Taylor	652				Seine and gill net.
10	Cromwell	Jas. H. Frazier	489	715	195		Seine and gill net.
11	Cromwell	I. B. Taylor					No report.
12	Cromwell	W. L. Taylor					No report.
13	Naubuc	E. S. Alcott	4	5,000	12		
14	East Hartford	H. R. Burnham					Did not fish.
15	Wethersfield Cove	Thrasher Bros		13,000	583	3,250	
16	Essex	L. E. Rand					No report.
17	Cromwell	F. J. Smith	300	6,000			Seine and gill net.
18	Lyme	L. A. Champion	40	888		4,528	Seine and gill net.
19	South Glastonbury	M. T. Hollister		500			
20	Hartford	W. E. Smith		14,170		1,500	
21	Saybrook	Spencer & Ingham					
22	Lyme	M. Howland					No report.
23	Hamburg	S. P. Anderson	472	2,500			Seine and gill net.
24	Windsor Locks	H. C. Douglass	4				
25	Poquonock	Mud Seine Fish Co	470				Seine.
26	Wethersfield	W. Buck		27,515		100	
27	Clinton	C. H. Hurd					See pound report.
28	Connecticut River	E. O. Ashley					Did not fish.
29	Westbrook	R. H. Stanard					See pound report.
30	Thames River	Church Bros	4			21,000	
31							No permit granted.
32	Hadlyme	N. E. Dawson				*15	
33	Chester	G. M. Francis		2,400			
34							No permit granted.
52	Haddam	T. D. Waterhouse		1,157			15,000 alewives.
			2,504	83,318	2,586	30,493	

ALEWIVES—PERMITS GRANTED, AND CATCH OF 1894.

Permit No.	Location.	Fishermen or Owners.	Shad Caught.	Alewives, Fresh. Dozens.	Alewives, Salt in Barrels.	Other Food Fish. Pounds.	Remarks.
1	Warehouse Point	Aaron Smith		417			
2							No permit granted.
3	Glastonbury	D. L. Talcott	6	3,405		*50	
4	Warehouse Point	I. W. White		25			
5	Gildersleve	A. F. Taylor	978	1,364		70	Seine and gill net.
6	Hockanum	Fox Bros.			585		
7	Naubuc	A. Twillcott & Son	4	2,500	500		
8	Dividend	C. E. Billings					Did not fish.
9	Cromwell	L. H. Taylor	304	1,250			Seine and gill net.
10	Cromwell	Jas. H. Frazier	810	6,458	81		Seine and gill net.
11							No permit granted.
12	Middletown	H. L. Taylor	31	1,220		275	Seine.
13	Naubuc	E. S. Alcott	6	6,000	40		
14							No permit granted.
15	Wethersfield Cove	A. Thresher & Co	40	34,450	701	3,440	
16							No permit granted.
17	Cromwell	F. J. Smith	350	5,416		2,400	Seine and gill net.
18	Lyme	L. A. Chapin					No report.
19							No permit granted.
20	Hartford	W. E. Smith	1,277	7,794			Seine and gill net.
21							No permit granted.
22	Lyme	M. R. Howland					Did not fish.
23	Hamburg	S. P. Anderson					See shad report.
24	Windsor Locks	H. C. Douglass					Did not fish.
25	Poquonock	Mud Seine Fish Co	475				Seine.
26	Wethersfield Cove	W. Buck	20	27,000		100	

*Sturgeon.

ALEWIVES—PERMITS GRANTED, AND CATCH OF 1894—CONCLUDED.

Permit No.	Location.	Fishermen or Owners.	Shad Caught.	Alewives, Fresh. Dozens.	Alewives, Salt in Barrels.	Other Food Fish. Pounds.	Remarks.
27	Clinton	C. H. Hurd					See pound report.
28							No permit granted.
29							No permit granted.
30							No permit granted.
31	Cromwell	Chas. Smith		1,416		2,000	
32	Oronoque, Hous. River.	C. F. Weed					Did not fish.
33	Cromwell	Clark, Smith & Co	163	6,666			Seine.
34							No permit granted.
35	Middletown and	E. W. Button					
36	Portland	I. F. Walker		9,471			
37	Cromwell	W. L. Frazier	144	3,971		660	Seine.
38	Hartford	Wm. McCabe		1,930			
39	East Berlin	H. P. Buckingham	247				Seine.
40	Hartford	W. F. Porter		600			
41	Hartford	I. I. Bell					No report.
42	Hartford	W. L. Winship				*46	For propagation.
43	Haddam	D. L. Trowbridge					No report.
44	Hartford					†500	
45							No permit granted.
46	Portland	E. T. Markam		2,970		300	
47	Shailerville	W. H. Arnold		2,369			
48	Higganum	Chalker & Bailey		713			
49	Hadlyme	E. W. Ely		7,500			
50	Higganum	C. A. Clark		250			
51							No permit granted.
52	Tylerville	F. D. Waterhouse	869	1,200			Seine and gill net.
			5,724	136,345	1,907	11,841	

*Black Bass. †Eels.

Inventory.

The following is an inventory of property of the State, November 1, 1894, in the hands of the Commissioners, and where located:

DIVIDEND (ROCKY HILL).

1 aquarium and fixtures	$10 00
15 hatching jars and fixtures	78 75
25 feet ½-inch rubber hose	1 00
22 feet 1-inch rubber hose	1 00
1 fine mesh net, 8 rods long, 16 feet deep	25 00
2 lanterns	1 00
4 egg pans	50
1 fish scale	20
2 jar wrenches	50
Total	$117 95

LIME ROCK.

29 cans for transporting fish	$90 00

BIRMINGHAM.

1 wood building	$150 00
1 dory boat, 14 feet long, etc	15 00
18 jars for hatching, @ $5 25	94 50
2 aquariums, filters and pipe	40 00
2 new hauling seines, 10 rods long, with rope	46 00
1 old hauling seine, 12 rods long	5 00
2 old cans for conveying fry	5 00
3 chairs, 1 thermometer, pans, pails, hammer, etc	4 00
Total	$359 50

JOSHUATOWN (LYME).

Four retaining plants for shad and salmon	$5,000 00
Hatching building and piping, with fixtures	430 00
Material and labor on upper dams and flumes	285 64
Two new aquariums	35 48
Fifteen hatching jars, $5.25 each	78 75
Bill of tools in hatchery, to wit: 4 hooks, 5 picks, 4 forks, 8 shovels, 3 hoes, 5 broad axes, 6 narrow axes, 1 crow-bar, 12 wheel-barrows, 5 water pails, 4 dippers, 1 hay knife, 1 grindstone, estimated	22 10
Total	$5,851 97

SUMMARY.

Inventory at Joshuatown	$5,851 97
Inventory at Birmingham	359 50
Inventory at Dividend	117 95
Inventory at Lime Rock	90 00
Books, stationery, stamped envelopes, etc., in hands of Commissioners	25 00
Total	$6,444 32

Applicants for Trout Fry, and Furnished, Season of 1893.

Atwoodville — H. D. Abbee, James A. H. Bowers, H. O. Hunington.

Birmingham — George C. Woods, W. G. White, C. T. Baldwin, M. D., C. D. Nettleton, Robert B. May.

Bridgeport — H. A. Bishop, G. N. Morehouse, Dr. R. T. Bishop, George Winton, W. E. Ritch, H. W. Platt, Elliot Plumb, Hon. W. D. Bishop.

Bloomfield — Dwight C. Newberry, A. A. Viets, M. Haggerty, Frank Kinsella.

Brooklyn — Thomas S. Marlor, and seven others.

Beacon Falls — George L. Clark, Charles B. Clark, Rudolph Houpt, S. S. Dearbon.

Canaan — C W. Camp, Samuel E. Eddy, F. S. Stevens, J. S. Adams, L. A. Caldwell, J. E. Rhoades, Dr. W. S. Camp, J. H. Drake, Lewis Rhoades, George W. Dederick, Dr. Hiram Eddy, S. N. Eddy, C. D. Milliken, Hon. A. T. Roraback.

Centerbrook — Northa Wright, A. M. Wright.

Central Village — F. H. Tillinghast, P. Mathewson.

Cornwall Bridge — George H. Beers, A. R. Reed, S. L. Hollister, W. Bearce, Arthur Reed, G. W. Beers.

Clinton — Albert Hurd, E. A. Hurd.

Clintonville — David L. Clinton.

Collinsville — John D. Andrews, W. W. Derrin, J. H. Bidwell.

Canterbury — Hon. M. H. Sanger, T. L. Richmond, A. C. Green, J. D. Poltell, T. J. Judd, George Stetson, C. S. Hyde, F. S. Ensworth.

Danbury — Stanley Reynolds, Benjamin Norris.

Eastford — M. F. Latham, I. B. Cushman, B. Macy, E. W. Warren, N. C. Badger.

Easthampton — Charles W. Berin, Floyd D. Willey, Frank D. Strong, Claton Barton, J. W. Lyon, Frank W. Bevin.

Falls Village — W. H. Chapin, S. Reed, A. C. Randall, G. W. Hall, I. P. Hornbeck.

Gildersleeve — Henry Gildersleeve, Jr., Henry Gildersleeve.

Glenbrook — William D. Phillips, Dr. C. E. Francis.

Haddam — Henry H. Kelsey, Arthur S. Clark, Loven Treat, Noah Clark.

Hartford — R. A. Griffing, Dr. Munroe Griswold, C. C. Goodrich, F. Ellsworth, E. P. Curtis, H. L. Bunce, W. L. Matson, John M. Taylor, Col. Jacob L. Greene, E. M. Bunce, Edgar Brewer, S. E. Elmore, J. R. Rockwell, W. H. Irving, Hon. Loren A. Cooke, W. C. Case, George W. Beach,

Charles E. Billings, Henry Andrus, W. R. Wheeler, George Townsend, L. H. Holt, R. W. Cutler, R. J. Beach, F. H. Elmore, Hon. J. R. Buck, C. Skinner, M. H. Whaples, A. S. Robinson, E. F. Combs, Burdett Loomis.

Hawleyville — S. A. Blakeman.

Higganum — Hon. Clinton B. Davis, George M. Clarke, Thomas J. Clarke, C. S. Hubbard, Albert N. Brainerd, E. L. Clark, J. H. Olber, S. W. Davis.

Kent — H. Wildman, Charles Lee, Charles S. Smith, Luther Eaton.

Lebanon — C. H. Loomis, George E. Martin.

Lime Rock — John Belcher, Samuel Bradley, I. P. Reed, L. Wickwire, Fred. Dean, Frank Reed, George Goodwin, Irving R. Fenton, Myron N. Dean, Daniel Dean, E. Doty, Miles Hunter, Daniel Briggs, W. Bierce, W. Butler.

Ledyard — Courtland Lamb, James Harvey.

Long Hill — R. C. Toucey, J. W. French, G. S. Hadley, W. A. Gabler. Louis M. Wakeley.

Lakeville — Dr. George Knight, H. Williams, C. M. Turner, C. Kelsey, W. Miles, William B. Perry.

Lyme — Dr. Z. Griffin Ely, H. C. Burnam, H. A. Banning, L. A. Bill, F. D. Banning.

Litchfield — W. F. Marsh, C. D. Bishop, C. W. Hinsdale, C. Demming, E. P. Roberts.

Meriden — George E. Savage, Francis Stevenson, Jr., C. S. Perkins, Wilson L. Davis, S. L. Savage, Henry T. King, J. C. Byxbee, H. F. Wilcox.

Middletown — Charles W. Harris, Edward T. Jackson, S. Harris Warner, Charles W. Warner, Harold Smith, S. A. Robinson, Senator Chapman, and two others.

Millington — William L. Cone, Jr., Robert R. Cone, Henry C. Cone, Leonard Williams, Francis Stark, Rev. George L. Edwards.

Milldale — Chester H. Clark.

Monroe — Stephen B. Hayes.

Mystic — Careter W. Brown, Rollin S. Ketcham, C. G. Stevens, C. H. Cottrell, J. S. Crooks, Jeremiah Holmes, J. Dudley, George K. Newberry, William K. Holmes, C. H. Gardner, George Ives, Fred. Noyes, Charles Foote, Hiram Clift, Frank Foote, E. A. Schofield, H. N. Wheeler, C. H. Hoxie, R. E. Nyes.

Milford — Hon. George M. Gunn, A. J. Brown, Charles Michley, James Higby, E. B. Clark, C. A. Witchman, James Kelby, John Brown.

Montville — Charles A Johnson, George O. Allen, Hon. Alex. Robinson, Charles Comstock.

Moosup — M. A. Lunnell, W. S. Simons, William D. Rouse, Hon. Edwin Milner, Amos Tabor.

New Hartford — Lyman Doolittle, Walter Woodworth.

Newington — J. R. Stoddard, Elias M. Steele.

North Haven — Edward Goodyear, Horace Riggs.

New Haven — D. C. Sanford, E. L. Richards, Samuel H. Kirby, David A. Clark, George A. Maycock, Julian Leigh, George W. Lewis, Edward A.

Malley, Edward Malley, E. S. Kimberly, S. S. Thompson, Gardner Morse, Jr., J. B. Robertson.

Newtown — Hon. M. J. Houlihan, G. B. Botsford, M. F. Collins, Hawley Jennings, William H. Elmer, M. J. Cavanaugh, Fred. T. Glover, Edward Taylor.

New Milford — Hon. N. Staub, D. E. Soule, George F. Bisley, Samuel Francis, Robert Thompson, Anson Squires, A. H. Mahan, C. C. Smith, Hon. C. P. Lyman, John Addis, I. Bristol.

Norfolk — Horace A. Stainard, William O'Connor, Joseph B. Eldridge, E. J. Trescott, Winthrop Cone, Edward Stevens, R. I. Crissey, C. Caul, James Levi, Harry Stevens, Thomas Carroll.

North Granby — William W. Clark, George F. Eastman, R. J. Hayes, Edward C. Hayes, Fred. M. Godard, R. B. Viets, O. C. Godard, H. W. Judd, Lydin V. Gregory, Edwin M. Sterling.

New London — H. A. Penrose, William S. Chappell, A. T. Hale, George P. Prest, F. H. Chapell, Charles L. Ockford, F. E. Fenger, Henry G. Kenney, John H. Brown, George C. Strong, Lewis C. Atwood, John G. Stanton, D. L. Armstrong, David B. Hempstead.

New Canaan — Andrew Jones, L. M. Munroe, David H. Lockwood, Samuel Penoyer, Hiram Davis.

Norwalk — Chas. A. Wood, James Sutherland, C. B. Coolidge, Frank Woodward, H. E. Dann, T. S. Morison, James H. Hoyt, Hon. John S. Seymour, Augustus Merwin, Fred C. Burnett, O. L. Bassett, Samuel Lynes, Monroe Hayes, T. E. Lockwood, Henry S. Sillick, G. R. McGoughall, Henry D. Cowell.

Oxford — John Lounsbury, M. D.

Old Lyme — F. L. Babcock, Ernest Chadwick, Geo. E. Bump, A. C. Champion, J. D. Morley.

Pine Meadow — John Smith, Frank Raymond.

Plattsville — Franklin Sherwood.

Portland — F. W. Goodrich.

Plainfield — Dr. E. H. Davis.

Plainville — James E. Thomas, Samuel Thomas.

Redding — Geo. M. Cole, E. A. Bartram, Thos. Delany, S. S. Ambler, J. E. Miller, Wm. Manvel, Seth Sanford.

Rockfall — U. H. Coles, Ernest L. Coles.

Ridgefield — W. C. Barhite, E. S. Reynolds, L. C. Seymour, H. J. Kellogg.

Roxbury — A. L. Hodge, Chas. Sanford, Barton Hodge, Geo. Hurlburt, Myron W. Odell.

Saugatuck — Edwin M. Lees, R. H. Wheeler, E. S. Wheeler, E. S. Smith.

Seymour — L. T. Wooster, Chas. H. Guild, G. E. Matheiss, Ransom Chatfield, Ernest Hotchkiss, Chas. W. Dick.

Sharon — Willard Baker, Chas. Marvin, C. C. Gordan, James Wilbur, A. M. Card, Hon. Isaac N. Bartram, Geo. E. Gager, Geo. Bump, Geo. Barnett, S. Kirby, Samuel Schermerhorn.

Sterling — C. Hunt, A. J. Kebler, J. E. Pike, B. G. Stanton.

South Meriden — S. F. Bronson.

Stevenson — R. S. Hinman, J. B. Downes, W. S. Downes, Hon. David Torance.

Stamford — James B. Davenport, John Davenport, Arthur Miller, A. M. Palmer.

Suffield — Chancery Harris, Sidney Harrock.

Stepney — J. A. Tredwell, J. W. Tredwell.

South Windham — C. W. Backus, F. E. Pearl, Walter Plumley.

Southbury — D. S. Todd, J. T. Hickock.

Southport — E. C. Sherwood, E. L. Wells, E. P. Sherwood.

Somerville — Hon. Geo. E. Keeney.

Salisbury — Hon. D. T. Warner, T. F. Dexter, Wm. P. Everts, Geo. H. Clark, John J. Landon, Wm. Conklin.

South Manchester — Knight D. Cheney, R. O. Cheney, James W. Cheney.

Southford — W. Tuttle, Theodore F. Wheeler.

South Glastonbury — J. W. Pray.

Thompsonville — Geo. R. Steele, D. Robertson, Geo. T. Mathewson, Wm. Haywood, John H. Freer, Eben Henney.

Tracy — Frank C. Young, S. S. Matson, Elijah G. Hough, Almon J. Ives, A. W. Pendester, Chas. E. Yale, E. A. Ely, C. H. Young, Cassius O. Young, Wm. B. Morley.

Tolland — B. S. Root, E. S. Agard.

Torrington — Frank Conley, Miner Drake, J. W. Webster.

Unionville — John A. Merriman, E. W. Payne.

Waterbury — Dr. C. A. Ward, E. E. Wright, T. A. Munson, S. D. Williams, John P. Kellogg, John P. Elton.

Waterville — G. W. Tucker.

Watertown — Geo. A. Wright.

West Cornwall — Frank D. Wood, Ransom S. Smith, L. J. Nickerson, J. L. Washing.

Wauregan — Geo. T. Sanger, J. W. Atwood, H. E. Swan, C. E. Hill, S. Wilbur.

West Granby — Columbus Reed, Geo. O. Beach, Floyd E. Reed.

Westport — Frank E. Sturges, Dr. F. Powers, Ambrose S. Hurlburt, F. D. Ruland, M. D., Alexis Godillot, Joseph S. Sturges.

Willimantic — D. F. Hooker, John Culver, J. W. Culver, Frank S. Martin, Hon. Eugene S. Boss, E. G. Hatheway, J. M. Reed. J. W. West, Dr. T. R. Parker, D. E. Potter, Thos. Roberts, J. E. Brick, C. H. Townsend, J. A. Culerhouse, H. L. Edgarton, Thos. Brown, Fred Moulton, Hon. E. A. Buck.

Wilton — James Jones, Wm. L. Whitlock, G. H. Wardell.

Westford — Stephen D. Curtis, Darius A. Baker, Andrew Smith, M. Morrey.

1894.

Birmingham — F. N. Bowen, George Michterspermer, W. S. Downs, S. D. Lockwood, Joseph Hopehins, A. B. Nettleton.

Bridgeport — George N. Moorehouse, W. S. Rhoades, Alexander Hawley, H. A. Bishop, Dr. R. F. Bishop.

Bloomfield — Morris Holcomb, Bert Messenger, J. G. Burr, L. J. Filley, A. A. Viets, M. Haggerty, Frank Kinsella.

Beacon Falls — George W. Beach, S. S. Dearbon.

Canaan — Samuel Eddy, W. H. Camp, A. T. Roraback, J. H. Roraback, F. S. Stevens, J. S. Adams, C. D. Milliken, J. H. Drake, Lewis Rhoades, J. E. Rhoades.

Central Village — Dr. E. A. Rogers, W. D. Bouse, Frank H. Tillinghast, James Popple.

Colebrook — T. S. Skilton, R. Rockinell, Edward Oles, Joseph Turner, Ralph Turner, Luther Sparks, E. M. Moore, C. S. Smith, George Mills, Adin Vining.

Collinsville — J. H. Bidwell, J. S. Smith, J. D. Andrus, W. N. Derwin, A. S. Thayer, Melvin Barnes, B. A. Cowle.

Danbury — Stanley Reynolds, G. M. Reynolds, P. H. Hopper.

Essex — Henry L. Pratt, Clayton Comstock, Henry D. Comstock, Edward Comstock, Clement G. Bushnell, George Durant, G. H. Hardman, Ernest Brow, William Saunderson, Charles Howington.

Falls Village — W. H. Chapin, H. A. Ford, G. A. Capron, D. K. Colepaugh, Sidney Reed, C. E. Hanchett, A. C. Randall, G. W. Hall, I. P. Hornbeck, P. Chapman, E. Hornbeck, E. W. Spurr, H. C. Gaylord, D. E. Dean, W. Hubbell, George Brown.

Georgetown — S. Bittenburg.

Hadlyme — Elliott W. Ely, W. B. Beckwith, H. A. Beckwith, W. A. Simpson, John Holmes, George Murray, R. A. Phelps, S. J. Daniels, Geo. W. Hall, W. E. Roselle, Ernest L. Selden, W. A. Brooks, N. Daniels, F. D. Barming, John Comstalk.

Hartford — Henry Andrus, George Townsend, M. H. Whaples, P. E. Tucker, S. A. Robinson, L. E. Robinson, E. A. Wander, S. A. Carroll, J. M. Davis, C. E. Billings, Ralph W. Cutler, F. C. Sumner, E. P. Curtiss, H. L. Bunce, F. W. Goodrich, C. C. Goodrich, Wm. H. St. John, J. O. Enders, Monroe Griswold, R. A. Griffing, Lyman B. Jewell, C. F. Poindexter, E. H. Rathburn, E. Hart Fenn, G. F. Heublein, Louis F. Heublein, C. W. Driscoll, R. E. Fisher, George A. Hoffman.

Hawleyville — Hawley B. Jennings, Samuel Blackman, S. A. Blackman.

Lebanon — Charles H. Loomis, E. A. Stiles, Samuel N. Hyde, Isaac Gillett.

Lime Rock — John Belcher, Samuel Bradley, J. P. Reed, L. Wickwire, F. Reed, Fred. Dean, Frank Dean, George Goodwin, Irving R. Fenton, Myron N. Dean, E. Doty, Miles Hunter, Daniel Briggs, W. Pierce, W. Butler, Daniel Dean.

Lakeville — Dr. George Knight, C. M. Lumuner, Bert Warner, John Sherwood, Fred. P. Miles, Hubert Williams, C. H. Kelsey, W. Miles, John K. Stuart, C. M. Turner.

Lyme — James Holt, W. C. Noyes, F. L. Babcock, J. F. Bugbee, F. G. Gates, J. D. Mosley, Nelson Appleby, W. W. De Wolf, Henry Noyes, Roger Champion, Charles Mosley, D. O. Maynard, D. P. Huntley, R. W. Chadwick, Seth Chadwick.

Litchfield — F. N. Newcomb, William Marsh, George B. Sanford, Dr. J. T. Burrall, C. R. Bishop, C. B. Bishop, E. P. Roberts, W. H. Wheeler, John Sepples, C. W. Hinsdale.

Merrow — Edgar Green.

Merwinsville — J. T. Underhill, Jr.

Middletown — S. Harris Warner, Charles Warner, Edward T. Jackson, S. A. Robinson, C. W. Harris, W. C. Jones, J. R. Pitt, Samuel Babcock, J. E. Palmer, E. S. Stiles, D. W. Camp, Robert Stebbins.

Moosup — Amos Taber, M. A. Lumnell, W. S. Simons.

Mystic — Jerry Holmes, J. H. Newberry, E. A. Noyes, A. G. Schofield, A. E. Schwoonover.

New Haven — D. H. Clark, J. T. Benham, C. F. Tuttle, J. T. Newton, Robert Daley, Samuel Kirby, E. S. Kimberly, William Atwater, George W. Lewis, George A. Maycock.

Newtown — M. J. Houlihan, M. Cavanaugh, George B. Botsford, Wm. H. Elmer, Fred. T. Glover, Edward Taylor.

Norwich — John C. Morgan, Fred. Tyler, George A. Stanton, J. C. Monroe.

New Milford — Nicholas Staub, D. E. Soule, Thomas Beay, Horace Crofut, Seth Marsh, H. A. Warner, J. B. Hopin, William Morey, Sherman Green, Perry N. Hall, Frank Everts, Charles Couch, M. A. Kelley, A. B. Hill, J. L. Buck, Thomas Richmond, H. O. Warner, F. N. Woodruff, Frank Ervin, William Levinos.

Norfolk — Winthrop Cone, Joseph B. Eldridge, William O'Connor, Edward Stevens, Harry Stevens, Thomas Carroll, E. J. Trescott, R. J. Crissey, C. Caul, James Levi.

New Canaan — Samuel Tenney, C. W. Barton, D. H. Lockwood.

North Granby — C. J. Hayes, Harvey Goddard, O. C. Goddard, M. L. Loveland, Fred. M. Goddard, O. N. Goddard, P. B. Goddard, George S. Goddard, Lydia C. Gregory, A. B. Viets, F. A. Pratt, Philemon Robbins, A. S. Cook, J. E. Spaulding.

New London — H. A. Penrose, William S. Chappell, T. H. Chappell, C. D. Boss, D. B. Hempstead, J. N. Clinton, W. C. Cady, J. H. Hill, Geo. C. Strong, E. B. Keeney, John G. Crump, A. T. Hale, H. H. Stoddard, George B. Prest, Dr. J. G. Stanton, I. N. Harris, L. H. Jones, Elisha Post.

Norwalk — John P. Treadwell, C. W. Morrey, William Anderson, Robert Van Buren, Hubert Bishop, C. N. Wood, William Sheldon, Edwin O. Keeler, R. J. Crawford, James Sutherland, Horace E. Dann. Henry Silleck, George Finch, Samuel Lynes, H. A. Duane, C. B. Coolidge, Frank Woodward, T. S. Morrison, Hon. John S. Seymour, Augustus Merwin.

Plainfield — E. H. Davis, Hon. Edwin Milner.

Plattsville — Franklin Sherwood.

Redding — John Nickerson, Seth Sanford, S. S. Ambler.

Ridgefield—W. C. Barhite, A. G. Croft, F. H. Stafford, E. S. Reynolds, W. B. Benedict, F. C. Lee, H. J. Kellogg, L. C. Seymour, D. W. Olmstead, A. S. Nash.

Salisbury—D. T. Warner, H. F. Landon, Geo. Clark, C. Wanger, N. Daniels, M. Warner, P. Warner, G. George, W. Ward, M. Gogings, R. Little, Wm. Everts, G. Bowers, W. F. Walton.

Seymour—Chas. H. Guild, Branson Chatfield, C. F. Wedge, G. E. Mathews, L. T. Wooster.

Sharon—Geo. E. Gager, Samuel Schermerhorn, Isaac N. Bartram, Geo. Bump, S. Kirby.

Springhill—William H. Gardner.

Stevenson—J. B. Downs, R. S. Hinman, W. S. Downs, Hon. David Torance.

Suffield—John L. Wilson, Sidney Hancock, A. W. Lewis, C. S. Harris.

Stamford—Edward M. Tracy, John Ritz, Edward Tray, Geo. T. Brown, Arthur Miller, James B. Davenport, John Davenport, Belden Brown.

South Windham—E. C. Winchester, A. S. Winchester, W. C. Backen, F. E. Pearl, Walter Plummey.

Stonington—Edward Davis, John Miner, Warren Randall, Horace G. Lewis, Geo. E. Stewart, Chas. Champlin.

Saybrook—J. P. Newton.

South Norwalk—Walter E. Lewis, C. S. Trowbridge, James A. Brown, S. A. Bawn.

South Glastonbury—J. U. Pray, Frank McLean.

Southport—F. P. Sherwood, Wm. Glover, E. S. Wells.

Thompsonville—Geo. T. Mathewson, Albert H. Mathewson, W. P. Henry, A. H. Mathewson, John H. Fowler, John H. Fren, H. L. Vietts, Geo. R. Steele, H. M. Marks, Wm. N. Henry, D. Robertson.

Torrington—Miran Drake, Geo. Drake, Hulbert Hayes, Frank Conley, and five others.

Westport—Dr. F. Powers, P. D. Bulard, S. B. Wheeler, Dr. Gilbert, J. G. Cannon, Edward M. Lees, Edward Smith, Frank Sturges, L. B. Cannon, A. F. Dowers, G. J. Underhill.

Willimantic—Col. J. D. Chaffee, J. E. Brick, John L. Walden, Hurbert Sanderson, W. S. Crane, J. B. Baldwin, W. A. Buck, Dr. T. R. Parker, F. D. Martin, O. D. Brigham, H. C. Lathrop, J. A. McDonald, F. S. Martin, Geo. M. Harrington, W. C. Morris, J. D. Bentley, Chas. Fenton, D. E. Porter, E. H. Moulton, E. G. Hatheway, E. S. Boss, J. M. Reed, O. H. K. Bisley, J. W. Webb, D. F. Hooker.

Windsor Locks—Frank H. Griswold, H. L. Centler, Theo. Rick, Kernon McCabe, O. F. Cleveland, Frank Towne, J. H. Videon, S. B. Douglas, H. C. Douglas.

Wilton—Richard Fitch, E. S. Roscoe, W. S. Keeler.

Winsted—S. C. Colt, M. H. Tanner, L. C. Strong, L. A. Gillette, H. J. Perne, E. B. Gaylord, Chas. K. Hunt.

Lake Trout.

There were 100,000 lake trout distributed, as follows, during 1893:

Twin Lakes, Salisbury	40,000
Mount Riga Lake	20,000
Twin Lakes, Lyme	20,000
Snipsic Lake, Rockville	20,000
	100,000

There were also 107,000 salmon fry planted in the Connecticut River and tributaries.

Also, 100,000 brown trout were given to the following applicants:

Thomas S. Marlor, Brooklyn	5,000
Samuel E. Eddy, Canaan	5,000
Hon. M. H. Sanger, Canterbury	5,000
Samuel E. Elmore, Hartford	5,000
Hon. L. A. Cooke, Hartford	5,000
Hon. Clinton B. Davis, Higganum	5,000
John Belcher, Lime Rock	5,000
Hubert Williams, Lakeville	5,000
Hon. George M. Gunn, Milford	5,000
Hon. Edwin Milner, Moosup	5,000
Hon. M. J. Houlihan, Newtown	5,000
Hon. N. Staub, New Milford	15,000
Edward Stevens, Norfolk	5,000
George E. Gager, Sharon	5,000
I. N. Bartram, Sharon	5,000
E. C. Sherwood, Fairfield	2,500
D. T. Warner, Salisbury	5,000
George T. Mathewson, Thompsonville	2,500
E. S. Bloss, Willimantic	5,000
	100,000

There were 100,000 lake trout distributed in the following lakes during 1894:

Mount Riga Lake, Salisbury	25,000
Wonosopomack Lake, Lakeville	25,000
Long Lake, Winsted	25,000
Warramaugh Lake, New Preston	25,000
	100,000

Also, 25,000 salmon fry were planted in the Connecticut and Saugatuck Rivers.

Brown trout were given to the following applicants:

James B. Davenport, Stamford	10,000
Morris Holcomb, Bloomfield	10,000
S. E. Eddy, Canaan	10,000
E. Hart Fenn, Hartford	5,000
James Holt, Lyme	10,000
C. N. Wood, Norwalk	10,000
Edward M. Lees, Westport	5,000
Dr. F. Powers, Westport	5,000
F. P. Sherwood, Southport	5,000
H. A. Penrose, New London	10,000
John Belcher, Lime Rock	10,000
G. E. Gager, Sharon	10,000
Jerry Holmes, Mystic	5,000
C. E. Billings, Hartford	5,000
Hubert Williams, Lakeville	10,000
M. J. Houlihan, Newtown	10,000
D. T. Warner, Salisbury	10,000
Hon. N. Staub, New Milford	10,000
George T. Mathewson, Thompsonville	10,000
I. N. Bartram, Sharon	10,000
George N. Morehouse, Stratford	10,000
W. A. Barhite, Ridgefield	10,000

Application for Brook Trout.

Date.....

Name.....

Post-office address.....

Nearest telegraph office.....

Nearest express office.....

Railroad station where applicant will meet and receive the fish.....

Name of railroad.....

Name of stream.....

Location of stream.....

Is it a public stream?.....

Is it a natural trout stream?.....

Tributary of what stream or lake?.....

Quality of water (hard or soft)?.....

Depth of deepest part?.....

Temperature in July, at surface?.....

If a running stream, is it through wild or cultivated lands?.....

Volume of water as near as can be stated?.....

What kind of fish does it contain?.....

What is the principal local food of the fish?.....

What is the sentiment of the locality in regard to the laws for fish protection?

Is the law well enforced?.....

State, as accurately as possible, the results of previous stocking.....

Is it desired that the fry be taken to the point of planting by the distributing agent of the Commission, to be planted by him?.....

Is the person, who is to receive the fry, experienced and competent to take care of and plant them?.....

REMARKS AND INSTRUCTIONS.

All fish distributed by the Commission are for public streams only.

Persons desiring fry must arrange to receive them promptly, at their nearest station on the main line of railroad, as the messenger in charge generally has fish for different persons each trip. No fish will be left at a railroad station unless some duly authorized person is there to receive and care for them.

Deposit all fish as near the head of the stream or lake as possible, where large fish cannot feed on them and where they may find hiding places.

No person should go to sleep while transporting fish, or leave them alone when in the cans, as it will be sure death to them.

Water in cans containing fish always requires aerating, either by constant dipping, or by shaking the cans; as directed by the messenger on delivery, who will give full instructions as to the care of the fish during transportation.

Trout will be distributed only in those waters which are favorable to their growth and reproduction. They should never be introduced in waters ranging above seventy degrees (Fah.), in midsummer, or in water containing mud-pouts, bass, pickerel, pike, or any fish destructive to the salmon family.

Good results cannot be expected from planting trout in public waters unless the laws are properly enforced, and special pains are taken to plant the fish in proper places and in streams where the conditions are favorable.

N. B. It is highly important that every inquiry should be fully answered and the names of all waters mentioned, and, especially, the names and addresses of applicants should be plainly and correctly written,—otherwise the application may be deferred.

N. B. This application must be completed and forwarded to the undersigned before March 20th.

.....

Permits.

FORM OF APPLICATION FOR PERMITS.

STATE OF CONNECTICUT,
FISH COMMISSION OF INLAND FISHERIES.

No.....

Mr.....

The applicant will answer these questions, and if satisfactory to the Commission permit will be granted:

Name?.....
Address?.....
Location of fishery?.....
Do you own or lease fishery?.....
Who is the owner of fishery?.....
Give the number if one and name of fishery?.....
Do you agree to fish only with 2½ inch mesh net?.....
Do you agree to stop fishing May 12th?.....
Do you agree to fish for alewives only?.....
Do you agree to abide by the law relating to fishing?.....

Date.....

(Signature).....

FORM OF PERMIT.

STATE OF CONNECTICUT,
FISH COMMISSION OF INLAND FISHERIES.

No.....

KNOW ALL MEN BY THESE PRESENTS, That, in accordance with the provisions of Section 2511 of the Revised Statutes, we do hereby grant permission to.....
to use a 2½ inch mesh net for the purpose of taking alewives in.....
from.....until May 12, 189 .

Signed:

.....
.....
.....
} *Commissioners.*

Hartford, Conn.,.....189 .

NOTICE SENT TO FISHERMEN WITH PERMITS.

We call your special attention to the following sections of the Revised Statutes of 1888, pages 553 and 555, Chapter 150.

Section 2510. The owner or owners of every pound, weir, or other similar fixed contrivance, or of any fishing pier, seine, drag, or gill net used in any waters of this State for fishing purposes, shall make written report to one of the Fish Commissioners, on or before the first day of October in each year, specifying the number of shad caught by his or their respective pounds, weirs, or other similar fixed contrivances, piers, seines, drag, or gill nets; also the number of each other kind of edible fish so caught by them between the 15th day of April and the 25th *day of June in each year.*

Section 2526. Every person violating any section of this chapter for which no punishment has been provided, shall be fined not less than three nor more than fifty dollars, or imprisoned not more than thirty days, or both.

You will take due notice and govern yourself accordingly.

Signed:

JAS. A. BILL,
S. M. BRONSON,
R. E. FOLLET,
} *Commissioners.*

List of Fish Commissioners.

The United States.

Col. Marshall McDonald, Commissioner.....Washington, D. C.
Captain J. W. Collins, Assistant in charge of Fisheries Division.
Richard Rathbun, Assistant in charge of Scientific Inquiry.

Alabama.

Col. D. R. Hundley.....Madison
Hon. Charles S. G. Doster.....Prattville

Arizona.

T. W. Otis.....Prescott
John Howard.....Prescott
C. W. Stearns.....Phenix

Arkansas.

H. H. Rottaken, President.....Little Rock
W. B. Worthen, Secretary.....Little Rock
J. W. Callaway.....Little Rock

Dominion of Canada.

Hon. C. H. Tupper, Minister of Marine and Fisheries.....Ottawa
Hon. John Tilton, Deputy Minister.....Ottawa
S. P. Bauset, Chief Clerk.....Ottawa
Samuel Wilmot, Superintendent of Fish Culture.....Ottawa
Inspectors of Fisheries: J. R. Kinney, Yarmouth, N. S.; R. C. Hockin, Pictou, N. S.; A. C. Bertram, North Sydney, N. S.; J. H. Pratt, St. Andrews, N. B.; R. A. Chapman, Mocton, N. B.; D. Morrow, Oromocto, N. B.; E. Hackett, Tignish, P. E. I.; W. Wakeman, Gaspe Basin, P. Q.; Thomas Mowat, New Westminster, B. C.; Alex McQueen, Winnipeg, Manitoba; F. C. Gilchrist, Fort Qu'Appelle, N.W.T.
Officers in Charge of Fish-Breeding Establishments: S. Wilmot, Superintendent of Fish Culture, Newcastle, Ont.; Charles Wilmot, Officer in Charge, Newcastle hatchery, Ont.; Wm. Parker, Sandwich, Ont.; L. N. Cattelier, Tadoussac, Q.; H. Davis, Gaspe, Q.; A. H. Moore, Magog, Q.; Alex Mowat, Restigouche, Matapedia, P. Q.; A. B. Wilmot, Bedford, N. S.; C. A. Farquharson, Sydney, N. S.; Isaac Sheasgreen, Miramichi, N. B.; Charles McCluskey, St. John River, Grand Falls, N. B.; Henry Clark, Dunk River, P. E. I.; Thomas Mowat, British Columbia hatchery, New Westminster, B. C.

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M. Harvey, Secretary ..... St. Johns
Adolph Nielson, Superintendent of Fisheries ..... St. Johns

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Jos. D. Redding, President ..... Sacramento
H. L. MacNeil ..... Los Angeles
Wm. C. Murdock, Secretary ..... San Francisco

COLORADO.

Gordon Land ..... Denver

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Jas. A. Bill, President ..... Lyme
S. M. Bronson, Secretary ..... Hartford
R. E. Follett, Superintendent ..... Lime Rock

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Christian Swartz ..... Norwalk
Geo. C. Waldo ..... Bridgeport
C. W. Beardsley ..... Milford
F. Bottsford, Clerk ..... New Haven

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Charles H. Shubert ..... Odessa
Dr. E. G. Shortlidge, Superintendent of Hatcheries ..... Wilmington

GEORGIA.

R. T. Nesbitt ..... Atlanta
Dr. H. H. Cary, Superintendent ..... La Grange

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IOWA.

E. D. Carlton ..... Spirit Lake
Ole Bjorenson, Superintendent.

KANSAS.

John M. Brumbaugh ..... Concordia

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E. W. Gould, Sea and Shore Fisheries.....Searsport

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A. C. Garlichs, Secretary.....St. Joseph
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James W. Day, Superintendent.....St. Joseph

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William L. May.....Fremont
J. C. McBride.....Lincoln
B. E. B. Kennedy.....Omaha
M. E. O'Brien, Superintendent.....South Bend

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George T. Mills.....Carson City
Ernest Harris, Deputy.....Carson City

New Hampshire.

Nathaniel Wentworth.....Hudson
Elliott B. Hodge.....Plymouth
W. H. Griffin.....Henniker
Elliott B. Hodge, Superintendent of Plymouth and Sunapee Hatcheries, ...Plymouth

New Jersey.

William Wright.....Newark
Frank M. Ward.....Newton
Robert D. Foote.....Morristown
W. A. Newell.....Pennsville

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W. H. Bowman.....Rochester
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Robert Hamilton.....Greenwich
Isaac N. Cox.....Ellenville
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Shell-fish Commission: E. G. Blackford, Commissioner; William G. Ford, Engineer; J. W. Merserau, Oyster Protector, 80 Fulton Market, New York. Chief Game and Fish Protector, J. W. Pond, Albany.

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William Lantz, Superintendent of Fisheries.....Sandusky

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Calvert Spensley.....Mineral Point
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James Nevins, Superintendent.....Madison

WYOMING.

Louis Miller .....Laramie

BOSTON FISH BUREAU,

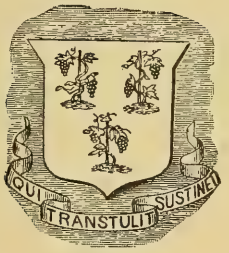
No. 3, Long Wharf, Boston, Mass.

Fred. F. Dimmock.....Secretary

ANNUAL REPORT

OF THE

SHELL-FISH COMMISSIONERS.



STATE OF CONNECTICUT.

1894.

HARTFORD, CONN.:
THE FOWLER & MILLER CO., PRINTERS AND BINDERS, 341 MAIN STREET.
1894.

REPORT.

To the Governor and General Assembly of the State of Connecticut:

The Shell-fish Commissioners respectfully submit their report for the two years ending September 30, 1894. The financial statement is to the 30th day of September, 1894, in accordance with the statute making the fiscal year end upon that date, and from it all matters have been excluded which were left over for adjustment from the "deadlock," but are not legitimately a part of the receipts and expenses of the two years covered by the report.

THE TOTAL RECEIPTS

have been $14,992.48, and the expenses $8,858.02, leaving a balance of receipts over expenses of $6,134.46. There have been no unusual expenses, save in the matter of mud dumping, and that has not been excessive, while in all cases where the expenses are limited by law, the legal amount has not been exceeded. The receipts and expenses by the licensing of oyster boats is made a separate account, and it will be seen that in that new department a balance over expenses remains to the State.

THE COMMISSION.

On July 1, 1893, Mr. Christian Swartz, of Norwalk, became a member of the Commission, the other members being Messrs. Geo. C. Waldo of Bridgeport, and Charles W. Beardsley of Milford. Mr. Frederick Botsford was reappointed Clerk of Shell-fisheries. The Commission organized at that time by the choice of Mr. Waldo for chairman.

APPLICATIONS FOR LAND.

During the two years covered by this report there have been thirty-six applications to the Commissioners for land, covering 3,272.2 acres. Of these applications two were subsequently withdrawn, two were rejected, two were canceled, eighteen were granted conveying 1,298.5 acres, and twelve are still pending. In the con-

sideration of applications for oyster grounds it frequently occurs that the shadow of an old town title rests upon all or a portion of the land applied for, although that title may have been held in abeyance, having not been asserted for many years ; but the raising of the question casts a cloud upon the title, and the Commission does not care to give, nor the applicant to receive, a grant which may involve litigation. It would be of advantage to the State if such alleged holdings, upon which no taxes have been paid for twelve or fifteen years, were expressly declared available for designation to new holders upon application, for thereby quite a large amount of valuable oyster ground would be brought into the market. It is a fact that with the progress of experience in the business of oyster cultivation a constantly increasing quantity of oyster ground is becoming available for cultivation which has, from its peculiar character, been considered worthless, and holdings of this sort which have never been successfully worked, as well as grounds surrendered for what was actual worthlessness a number of years ago, are becoming available for business purposes. Oyster grounds are surrendered now only to escape taxation, as the State no longer returns the purchase money upon such grounds. During the past two years there have been eight surrenders of oyster grounds to the State, involving 431.9 acres, for which no return was made by the State. These grounds are in the market again, and it is not infrequently the case that ground surrendered by one man will be applied for by another, so that under the existing rule of no return from the State to the original purchaser, the State receives a duplicate of the original purchase money and the ground is listed for taxation.

TAXATION.

As will be seen by the financial statement the taxation of oyster grounds for the two years covered by the report has brought into the State $13,544 91. This does not include the amount received for licenses, which is in a separate account. Mr. Frederick Botsford, Clerk of Shell-fisheries, is made the assessor by statute, while the Commission acts only as a board of relief after the assessments have been made. Mr. Botsford's long experience in the business is of advantage to all concerned, his assessments meeting with very general approval, the few exceptions being adjusted satisfactorily by the board of relief. Complaints and appeals have been few, considering the whole number of assessments made, and the planters are not burdened by the tax if the business is at all profitable. Any

taxation is not pleasant when there are no profits in the business, but the Clerk and the Commission have no discretion beyond the value for purposes of cultivation of the lands assessed.

MUD DUMPING.

The law with reference to the inspection of mud dumping has been carefully observed, and but few instances of infraction of the law have been brought to the attention of the Commissioners. Whenever such cases have occurred the Commissioners have immediately communicated with the delinquent parties, and a prompt acknowledgment has been the result, with a remedy of the evil. It will be seen that the cost of the inspection of mud dumping for the two years covered by the report was $2,090.69. This is added to the expenses of the Commission, although not legitimately a part thereof. The law compels the sending of inspectors and the payment of the same, and that would be necessary whether an equal amount in taxation were received by the State or not. Were this expense deducted from the sum total the amount to the credit of the Commission over expenses which properly belonged to it would be proportionately increased. The cost of inspection for the two years covered in the report is large, but, as has been stated, the Commission has no option in the matter, but is compelled to furnish the inspectors and see that they are paid, the compensation being fixed by law.

NATURAL BEDS.

At the time of the establishment of the natural beds by boundaries confirmed by the courts and the Legislature, it was the intention to reserve them for the use of the citizens of Connecticut alone. This fact is expressed in the following extract from the Revised Statutes of the State:

WHO MAY WORK ON CONNECTICUT NATURAL OYSTER BEDS.

Revised Statutes, Sec. 2403. No person shall take, rake, gather, or collect, by means of dredges or otherwise, any oysters, shells, or shell-fish, in any of the waters of this State, on board of any boat or vessel, *for himself or any employer*, unless *he and his employer are at the time and have been for six months next preceding*, actual inhabitants or residents of this State, and any boat or vessel so used, with its tackle, apparel, and furniture, may be seized and proceeded against in the same manner as provided in Section 2400.

WEIGHT OF DREDGE ALLOWED.

Revised Statutes, Sec. 2404. No person shall use in dredging with any sailing vessel on any of the natural oyster, clam, or mussel beds of this State, any dredge or other contrivance weighing more than thirty pounds, exclusive of the bag or net, but it shall be lawful to dredge shells or shell-fish by steam power upon any private designated grounds by the owner thereof in any of the waters of the State.

PENALTIES.

For the violation of Section 2403 the penalty is the seizure of the boat, furniture, tackle, etc., etc., and if found to have been used in violation of law, its sale to pay all legal charges, and the balance to go one-half to the person who made the seizure and one-half to the town in which the seizure was made.

The sheriff, deputy sheriffs, and constables of all towns "shall," and any other person "may," make seizure of boats or vessels in which persons are working in violation of the law, and any person on board such boat or vessel obstructing such seizure shall be fined not more than one hundred dollars or imprisoned not more than six months, or both.

The penalty for the violation of Section 2404 is a fine of not more than one hundred dollars or imprisonment not more than six months, or both.

Notwithstanding this explicit and seemingly sufficient law, there had been, up to 1893, constant complaint on the part of citizens of the State that its provisions were disregarded and evaded. Vessels from without the State, manned by persons not citizens of Connecticut, would boldly come upon the natural beds to work, and vessels belonging in Connecticut, but manned by persons not citizens of the State, would do the same thing. As the prosecution of these infringers of the law required the personal time and attention of the honest workers, and involved a certain amount of expense and risk on their part, the evil was endured rather than go to the extreme involved in the enforcement of the law. At the last session of the Legislature, however, in 1893, at the instance of those who had been knowing to the violations of the law, a form of license for vessels working upon the natural beds was devised, which seemed likely to do away with much, if not all, of the evils complained of. This law was passed by the Legislature, and is as follows:

THE LICENSING OF OYSTER VESSELS.

[Extract from page 315, Public Acts of the State of Connecticut, passed January Session, 1893.]

CHAPTER CLXXI.

AN ACT CONCERNING LICENSES FOR OYSTER BOATS AND VESSELS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. No person shall take or gather any oysters from any natural oyster bed in the exclusive jurisdiction of the State in any boat or vessel, unless said boat or vessel shall be duly licensed and numbered in the manner hereinafter provided.

SEC. 2. Any person desiring to use any boat or vessel for such purpose, may make written application to the Clerk of Shell Fisheries, stating the name, owner, rig, general description, tonnage, and place where any such boat or vessel is owned, and said Clerk of Shell Fisheries shall issue to the owner of such boat or vessel a license to take and gather oysters from the natural oyster beds in the exclusive jurisdiction of the State for one year, unless sooner revoked, upon the payment of two dollars for a vessel or boat of under five tons, and for a vessel or boat exceeding five tons fifty cents for each additional ton, custom-house measurement; *provided*, that before such license is granted, the owner or master shall prove to the satisfaction of said Clerk of Shell Fisheries that such boat or vessel is legally entitled to work on the public beds of the State, and that the captain and crew of such boat or vessel have been residents of this State for one year next preceding the date of such license, and that the dredges and other contrivances do not weigh more than thirty pounds, as provided in Section 2404 of the General Statutes. Every boat or vessel so licensed shall, while at work upon any of the natural oyster beds of the State, display upon both sides of the peak of her mainsail, the number of such license, in black figures, not less than one foot in length, and the coat of arms of Connecticut painted or stenciled upon cloth of suitable and uniform material, to be attached or stitched to the sail. The Clerk of Shell Fisheries shall furnish such numbers and coat of arms when the license is granted. When any boat or vessel so licensed shall be sold to parties in this State, the license shall be transferred at the office of the Clerk of Shell Fisheries. Should said boat or vessel be sold out of the State, the license must be surrendered to the Clerk of Shell Fisheries.

SEC. 3. No boat or vessel so licensed shall use on the natural oyster beds of this State any naphtha, vapor, steam, or electric engine, or device for hoisting or operating dredges, or other devices for gathering oysters except by hand power.

SEC. 4. Any person using any boat or vessel in violation of the provisions of this act, or who shall use any device or number not furnished by the Clerk of the Commission of Shell Fisheries for such boat or vessel, or not bearing the coat of arms of the State, shall be liable to a fine of ten dollars for each day that said boat or vessel shall be so unlawfully used, and any boat or vessel which shall be found being used contrary to the provisions of this act, shall be liable to the penalties provided in Section 2400 of the General Statutes.

SEC. 5. Nothing in this act shall be construed as applying to any boat or vessel while used upon private oyster grounds.

SEC. 6. Whenever the Clerk of Shell Fisheries shall be unable to act on account of sickness or absence, any one of the Shell-fish Commissioners shall have power to grant licenses and perform all other duties of the clerk under this act.

SEC. 7. This act shall take effect upon its passage, with the exception of Section 4, which shall take effect June 1, 1893.

The list of licensed vessels under this law will be found elsewhere, and the arrangement appears to have worked in a very satisfactory manner. There have been no complaints of the violation of the law, and, indeed, it would be impossible for it to be evaded without detection. The applications for licenses are made upon a form provided by the clerk, and a full statement of the facts showing that the applicant is within the requirements of the law is made and sworn to before a justice of the peace or notary public, and upon that application the license and number are issued. While the fees for the licenses are not large, they are graded so as to be just and equal, and in the aggregate they amount to a considerable sum, which is paid willingly by the oystermen to secure to themselves the privileges which the law intends that they alone shall enjoy.

FOR THE PROTECTION AND PRESERVATION OF NATURAL OYSTER BEDS.

At the January session of the Legislature of 1893 there was passed, at the request of a considerable body of oystermen, an act for the preservation and protection of natural oyster beds, which is as follows :

CHAPTER XC.

(Page 252. General Statutes.)

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. Every person who shall, between the twentieth day of July and the tenth day of September, in any year, gather or take any oysters or shells from any natural oyster bed under State jurisdiction, and in the Housatonic River, shall be fined not more than fifty dollars, or imprisoned not more than thirty days, or both; *provided*, that nothing in this section shall be construed to prohibit the gathering or taking of shells or mussels in said Housatonic River below a line drawn from a stake on the west bank of said river at Quimber's Neck Point, so-called, and running thence in a northeasterly direction to a stake on the east side of the channel of said river.

SEC. 2. Any boat or vessel used by any person for taking any oysters or shells from such natural beds, or from the Housatonic River, between the twentieth day of July and the tenth day of September, in any year, shall be liable to seizure under the penalty provided in Section 2400 of the General Statutes, and such seizure may be made either within the town where the offense is committed or wherever, within this State, said boat or vessel may be found within one year after the commission of the offense.

SEC. 3. The provisions of this act shall not be so construed as to affect the right to construct or dig channels as provided for in Chapter CXXVIII of the Public Acts of 1889, or to prevent the taking of clams from any of the waters of this State.

SEC. 4. This act shall take effect upon its passage.

This act to bring about a close season upon the natural beds was thought necessary by prominent members of the Oyster Growers' Association, who were anxious to preserve the great natural beds of the State in their original productiveness, and who were aware that the constant working upon them at all seasons of the year was prejudicial to their recuperation and likely to exhaust them permanently in time. The season marked out by this law is that in which the "spawn," or "spat," of the oyster is floating in the water and settles upon the beds where the conditions are favorable, attaching itself to any objects which present an attractive surface and covering such objects with millions of small oysters. If not disturbed this "set" soon becomes firmly attached and visible to the naked eye

and is then "the seed" which is dredged up and transplanted to favorable locations for its further growth and development into the marketable oyster. The advantage of leaving the great natural oyster beds unworked during this period, and until the seed oysters have become fit for taking up and selling to the planters, is obvious, and the results of the "close season" are excellent. In 1893 the severe storms washed the beds during that term, and much of the seed was destroyed by being "sanded," but this year, 1894, no such storms occurred prior to the 10th of September, and the catch of seed oysters after that time was large and the quality generally fine. No case of infraction of this law has come to the knowledge of the Commissioners. It has been suggested by some of the most interested of the oyster men that the time of the close season might be extended with advantage to the 15th or 20th of September, as the young oysters develop very rapidly during this period and a few days make a marked difference in their size and ability to stand transplanting, and in cooler weather they can be taken longer distances without danger of injury.

THE BUOYING OF THE NATURAL BEDS.

In response to a call from the oystermen who work upon the natural beds, as well as from some of the adjacent private owners, the following act was passed at the legislative session of 1893 :

(Page 262. General Statutes.)

CHAPTER CX.

AN ACT CONCERNING OYSTER BED BUOYS AND RANGE MONUMENTS.

Be it enacted by the Senate and House of Representatives in General Assembly convened :

SECTION 1. The Shell-fish Commissioners shall cause those natural or public oyster beds in the exclusive jurisdiction of the State, known as the Stratford bed, the Fish Island and Roton Point beds, and the Bridgeport bed, to be marked by buoys, which shall be known as State buoys, and by range monuments on the shore, by which the lines can be relocated should any buoys be removed, and shall cause double buoys or a distinctive mark to be placed at any point on the boundary where the line changes in direction, and said buoys shall be maintained by the State. No buoys shall be so set or lines so run as to include within the natural or public beds any private or designated grounds.

SEC. 2. Any person injuring or removing such range monuments, or displacing such State buoys, shall be fined not more than fifty dollars, or imprisoned not more than thirty days, or both.

SEC. 3. After the first day of January, 1894, the Shell-fish Commissioners shall not expend during any one year, under the provisions of this act, a sum exceeding one-half of the amount received for licenses to work on the natural or public beds of the State during the year preceding.

SEC. 4. This act shall take effect upon its passage.

In accordance with the foregoing act the Shell-fish Commissioners have caused the natural beds therein designated to be buoyed, and have personally supervised the work. The best material procurable, which was not too expensive for the purpose, was used, and the buoys were distinctly marked so as to be easily distinguished from those of any private company or person. After a trial of a full year it is demonstrated that to keep the designated beds buoyed all the time would require a much larger outlay than the law allows, for owing to the force of the currents in exposed positions and the fact that such buoys are liable to be constantly run down and dragged about by the numerous vessels which traverse the beds, it is impossible to keep them properly aligned for any great length of time, and it would be necessary to reset them frequently. Of the buoys set by the Commissioners in the fall of 1893 but a very few, and those in exceptionally favorable positions, were found remaining a year later. It is the opinion of the Commissioners, however, that once properly buoyed in the fall, just prior to the opening of the "close season," and aligned once or twice, as occasion may demand, before the setting in of winter the aforesaid beds would be sufficiently designated to answer all practical purposes, while a resetting in the spring, if needful, could be made also. This would be more easily managed if permanent monuments upon the shore were established, but as the cost of these would far exceed the limit of the law the Commission cannot undertake them without special permission from the Legislature therefor. Prior to the buoying of the natural beds in 1893 it was not practicable to determine the necessity of these monuments, their number, or location. The buoying of the natural beds has been of benefit to the oystermen and the planters, and a liberal policy with reference to the work would be popular and appreciated.

In buoying the Fish Island beds the attention of the Commissioners was called to certain designations made by the town of

Darien within the limits of the original beds as laid out in the statutes of the State. As the town of Darien is a body corporate possessing the power to designate oyster grounds to individuals within certain limits, and as the statute above cited (Section 1, last clause) distinctly forbids the Commissioners to include in their buoying "any private or designated grounds," said designations were omitted from the natural bed, as buoyed by the Commissioners, without any attempt on their part to decide the validity of such designations, a matter which has been and now is in the courts. No other cases of disputed territory were brought to the attention of the Commissioners.

For the purpose of properly monumenting the lines of the natural beds which the law directs shall be buoyed, the Commissioners would respectfully suggest that an adequate appropriation be made by the Legislature.

LANDMARKS.

The more important landmarks have been kept in repair and are now in a good state of preservation, some of them having been rebuilt so as to be good for many years. Little money had been spent on these for several years previous, and their condition has required a larger outlay during the period covered by the report. Should landmarks or monuments for the rectification of buoy lines on the natural beds be added to these the expense of keeping them in repair would be added to the annual outlay for the preservation of landmarks, and the average expenditure would undoubtedly be increased, although the entire sum in any given year would not be large nor at all out of proportion to the value of the landmarks in the oyster business.

THE OYSTER BUSINESS.

As a business the Connecticut oyster industry continues to increase, and offers a fair return to the intelligent and persistent cultivator. The number of steamers and other vessels engaged and the acreage of the planters will be seen, by the tables accompanying this report, to be increasing all the time, and the very interesting and detailed statement of the amounts of shells, crushed stone, and gravel, put upon private beds this fall by prominent planters, affords a very excellent idea of the extent of the business. Over three and a half millions of bushels of these materials were used in preparing the private beds for this year's set; and when, in connection with that fact, it is remembered that this was but the preparation for a single year, and does not take into the account the millions of

bushels of oysters in various stages of development already upon the more than 70,000 acres of submarine oyster farms along this coast from Greenwich to Branford, some just estimate of the magnitude of the business may be obtained. The last reports of United States Fish Commissioner McDonald (for 1893) put the money investment in the Connecticut oyster industry at about $3,500,000, and the value of the annual catch at about $1,250,000. The men employed are put down at 1,100, and there are 500 vessels of all classes engaged in the work. The wages paid run from $260,000 to $300,000, and it is probable that these figures are low.

While the great storms of 1893, exceptional in their origin and character, did much damage to the oyster industry, the season of 1894 was remarkably free from such drawbacks, and there was a very full and very general set secured, which promises good returns if properly preserved and matured. Indeed, this year has been one exceptional in its favorable conditions, and with a return of general commercial activity the oyster business would, unquestionably, be prosperous. The star fish have ceased to alarm the intelligent and watchful planter, the mop dredge furnishing him a means for its certain extirpation; but the "drill," an enemy less easily managed, in some sections makes its presence felt to the loss and trouble of the planter. We regret to learn that in some localities, notably in New Haven harbor, the "drill" is becoming alarmingly destructive, and the damage which it inflicts seems to be almost beyond present remedy.

The Commissioners are constantly in the receipt of requests from the officials of other States for compilations of the oyster laws of Connecticut, such requests coming from the States on the Atlantic and Pacific seaboard, in the waters of which oysters are found and cultivated, and where, as a consequence, an interest in their intelligent management exists. As no complete file of the reports can now be had, some issues having been exhausted, and as even a complete set of the reports would not embrace all the existing laws, the Commissioners are unable to comply with these requests, and they would respectfully suggest that a publication of the oyster laws of the State in pamphlet form would be of advantage to the oystermen of the State, and convenient for the information of the authorities of other States which wish to profit by our experience.

GEORGE C. WALDO,
CHARLES W. BEARDSLEY,
CHRISTIAN SWARTZ,
} *Shell-Fish Commissioners.*

Financial Statement

OF THE SHELL-FISH COMMISSIONERS FOR THE TWO YEARS ENDING SEPTEMBER 30, 1894.

RECEIPTS.

Total amount received,		$14,992 48
For deeds delivered,	$1,298 50	
For drawing and recording deeds,	149 07	
For taxes collected,	13,544 91	
		$14,992 48

DISBURSEMENTS.

For pay and expenses of engineer,	$446 80	
For office rent and supplies,	994 01	
For clerical expenses,	2,925 00	
For Inspectors of mud dumping,	2,090 69	
For preservation of landmarks,	309 47	
For expense collecting taxes,	59 40	
For pay and expenses of Commissioners,	2,032 65	
		$8,858 02

SUMMARY.

Receipts for two years,	$14,992 48	
Disbursements for two years,	8,858 02	
Excess of receipts over disbursements,		$6,134 46

Licenses.

RECEIPTS AND DISBURSEMENTS ON NATURAL OYSTER BED ACCOUNT, FROM JULY 1, 1893, TO SEPTEMBER 30, 1894.

RECEIPTS.

For boat licenses,	$1,196 00

DISBURSEMENTS.

For services of engineer,	$175 25	
For use of steamers,	209 50	
For buoys, ropes, stone, etc.,	315 59	
		700 34
Excess of receipts over disbursements,		$495 66

LIST OF OYSTER STEAMERS USED IN CONNECTICUT WATERS, 1893-4.

Name.	Tonnage.		Capacity.	Owner.	Locality.
	Gross.	Net.	Bushels.		
H. S. Lockwood	69.50	34.75	1,000	E. F. Lockwood	Greenwich.
Ithiel	31.93	15.97	800	Chas. E. Palmer	Greenwich.
Susie			100	W. A. Cumming	Stamford.
Ripple	36.30	18.10	900	D. B. Decker	Norwalk.
Adeline	20.07	7.33	300	S. H. Lowndes	Norwalk.
J. Howard Lowndes	72.07	36.84	1,500	S. H. Lowndes	Norwalk.
Waneta	19.89	9.95	500	Gould Hoyt	Norwalk.
Cereus	16.57	8.29	400	C. W. Raymond	
Addie V	21.27	11.88	500	William Verity	Norwalk.
Laurel			400	A. Solomons	Norwalk.
Edith A	30.00	15.50	400	Joseph and Charles Vroom	Norwalk.
Freddie W. Decker	20.00	14.36	800	Peter Decker	Norwalk.
Island Bell	50.98	25.49	1,000	J. H. Lowndes	Norwalk.
Wm. H. Hoyt	91.02	45.51	2,000	Wm. H. Hoyt & Son	Norwalk.
Jessie Clayton	56.23	28.17	1,200	Chas. Lowndes	Norwalk.
C. B. Lowndes	28.43	14.22	1,400	W. C. Hulse and H. W. Wells	Norwalk.
Henry J	42.42	26.96	1,200	T. S. Lowndes	Norwalk.
Flora	20.49	10.25	500	A. D. Corson	Norwalk.
Mabel Stevens	31.74	21.12	1,200	W. I. Stevens	Norwalk.
Kate C. Stevens	104.65	52.33	2,500	W. I. Stevens	Norwalk.
Medea	54.02	27.01	1,000	H. Rowland	Norwalk.
Etta May	99.55	49.78	1,300	May Oyster Co	Bridgeport.
Josephine	85.89	42.95	2,000	Craw & L'Hommedieu	Norwalk.
F. C. & A. E. Rowland	55.78	26.82	1,000	D. K. Cole	Norwalk.
D. K. Cole	31.87	15.94	300	Sand Selleck	Norwalk.
Carrie			200	Geo. N. Warren	Norwalk.
Molly	29.36	19.44	200	C. W. Bell	Norwalk.
Alberta	23.78	13.28	500	B. Frank and Chas. F. Howell	Norwalk.
Ostrea	97.99	70.60	1,500	M. E. Morris	Bridgeport.
Golden Gale	18.08	9.04	300	M. E. Morris	Bridgeport.
Bond & Currier	94.86	66.63	1,400	A. A. Bond	Bridgeport.
Annie	71 83	48.50	800	Pierre F. West	Bridgeport.
Active	59.74	40.09	900	Pierre F. West	Bridgeport.
Florence	84.86	64.60	1,200	Henry J. Lewis	Bridgeport.
C. S. Conklin	52.96	34.15	950	Henry J. Lewis	Bridgeport.

LIST OF OYSTER STEAMERS USED IN CONNECTICUT WATERS, 1893-4.—CONTINUED.

NAME.	TONNAGE.		CAPACITY.	OWNER.	LOCALITY.
	Gross.	Net.	Bushels.		
Virginia	83.10	46.50	1,000	Henry J. Lewis	Bridgeport.
C. W. Hoyt	69.66	34.83	1,000	C. W. Hoyt & Son	Bridgeport.
W. M. Merwin	64.21	35.14	1,000	W. M. Merwin & Sons	Milford.
W. A. Cumming	76.17	40.84	1,100	W. M. Merwin & Sons	Milford.
Spark	22.15	10.08	200	C. D. Parmelee	New Haven.
Pioneer	44.37	24.19	400	Ludington & Palmer	New Haven.
Luzerne Ludington	74.27	37.14	1,000	Ludington & Palmer	New Haven.
W. H. Lockwood	48.94	29.71	1,000	H. C. Rowe & Co	New Haven.
Gordon Rowe	57.99	29.00	1,000	H. C. Rowe & Co	New Haven.
Ruel Rowe	147.85	73.93	2,400	H. C. Rowe & Co	New Haven.
Mikado	76.92	51.33	900	J. Smith & Son's	New Haven.
Daisy E. Smith	61.68	30.84	1,200	J. Smith & Son's	New Haven.
Jeremiah Smith	113.38	66.28	2,300	J. Smith & Son's	New Haven.
Enterprise	34.00	20.65	800	Hulse & Dunbar and Lancraft Bros	New Haven.
Isaac E. Brown	85.68	56.17	1,400	I. E. Brown	New Haven.
Ivernia	13.36	6.68	900	J. E. Bishop & Co	New Haven.
James Morgan	35.99	27.80	900	American Oyster Co	New Haven.
Emily Mansfield	66.28	47.82	1,200	F. Mansfield & Sons'	New Haven.
J. & G. H. Smith	42.53	21.26	800	G. H. Smith	New Haven.
J. & P. Thomas	79.02	48.48	1,500	Thomas Thomas	New Haven.
Smith Brothers	64.74	48.74	1,600	Smith Bros	New Haven.
Amanda	74.53	37.27	1,300	Lancraft Brothers	New Haven.
Richard W. Law	113.62	56.81	2,000	Richard W. Law	New Haven.
H. A. Barnes	64.82	43.34	1,500	Barnes & Lane	New Haven.
Jennie			300	G. M. Long & Co	New London.
Kittie			350	T. H. Buffham	New York.
Falcon			700	J. & J. W. Ellsworth	New York.
Lizzie E. Woodward			1,000	Van Name Bros.	New York.
J. W. Boyle			1,000	J. W. Boyle	New York.
J. P. Mesereau			1,500	Daniel Burbank	New York.
Lizzie H			1,600	Jacob I. Housman	New York.
Mystery			2,000	G. H. Shaffer & Co	New York.
Harry			2,500	Peter Androvette	New York.
Daisy			400	Mott & Schaffer	New York.

Alphabetical List of Owners of Oyster Ground

WITHIN THE JURISDICTION OF THE STATE, WITH THE NUMBER OF ACRES OWNED BY EACH, AS SHOWN BY THE BOOKS OF THE SHELL-FISH COMMISSION ON NOVEMBER 1, 1893, THE DATE OF THE LAST COMPLETED TAX LIST.

Name.	Town.	Acres.
Alling, H. M. & W. E.	New Haven	210.
American Oyster Co	New Haven	991.7
Anderson, Carl	Norwalk	13.8
Atwood & Higgins	Boston, Mass	200.
Atwood, H. K	Boston, Mass	349.4
Armstrong, C. H	Bridgeport	52.9
Armstrong, D. N	Bridgeport	48.2
Arsant, Franceline	Greenwich	10.
Averill, R. G.	Branford	50.
Backus, Harley C	New Haven	200.
Ball, Ernest E	New Haven	350.
Banks, Mark	Greenwich	2.
Barmore, H. W.	Greenwich	17.
Barnes & Lane	New Haven	533.
Barnes, Wm. S.	New Haven	101.2
Beardsley & Higby	Milford	800.
Beardsley, A. J. & Son	Bridgeport	267.
Beardsley, F. J.	Stratford	93 5
Beardsley, Frederick S.	Stratford	317.
Beers, Hon. A. B.	Bridgeport	174 3
Belden & Hall	Branford	105.3
Bell, Chas. W.	Norwalk	425.
Bell, Hiram	Norwalk	10.
Bell & White	Norwalk	120.
Benedict, Thos. E.	New Haven	270.
Bills, Henry	New Haven	17.4
Bishop, J. E., estate	New Haven	100.
Bogart, John	New Haven	44.6
Bohner, J. J.	Brooklyn, N. Y.	40.
Bond, A. A.	Bridgeport	293.6
Bond & Currier	Bridgeport	206.6
I. L. & J. L. Bradley	New Haven	12.
Bradley & Platt	Orange	47.5
Bramley, John G.	Jordan, N. Y.	212.
Bray, Rose & Ives	New Haven	131.5
Bray, Rose & Marks	New Haven	81.6
Brooks, T. D. & B. S.	Danbury	50.6
Brooks, Wm. T.	Norwalk	35.
Brown & Houche	Groton	19.5
Brown, Isaac E.	New Haven	565.9
Brown, Isaac E. & Co	New Haven	151.6
	Carried forward	7,720.7

Name.	Town.	Acres.
	Brought forward....	7,720.7
Brown, James N	Guilford	21.7
Brundage, J. C.	Greenwich	8.
Bryan, Wm	Branford	100.
Butler, Herbert M.	Auburn, R. I	65.2
Byxbee, Silas B	Norwalk	34.
Byxbee, Samuel, estate	Norwalk	10.
Cadmus, John	Woodhaven, L. I	46 3
Case, Henry L	Norwalk	45.6
Case, Wm. H	Norwalk	10.
Chard, Samuel	Greenwich	171.2
Chard, David B., estate	Greenwich	28 4
Chappell, J. M.	New Haven.	8.
Chipman, S. & D	New Haven	150.
Clark, Theo	Greenwich	42.
Cook, Oliver	Norwalk	434.
Cole, Hickson, W.	Norwalk	28.7
Collinge, John, estate	Greenwich	16.
Craw & L'Hommedieu	Norwalk	1,810.3
Crockett, Alfred S	Norwalk	2.
Crockett, Julia L.	Norwalk	12.1
Cumming, Thomas	Stamford	36.2
Cumming, Wm. A & Thos	Stamford	493.5
Cumming, William A.	Stamford	249 9
Daley, John	Westport	87.7
Dayton, Geo. W.	New Haven	101 8
Dayton, John	Greenwich	2.
Dayton, John & Sons	Greenwich	438.1
Davis, Chas. W.	Portchester	7.7
Davis, Geo. N	Norwalk	6.
Decker, Abraham	Norwalk	156.
Decker, David B	Norwalk	68.7
Decker & Raymond	Norwalk	204 4
Decker, John	Stamford	10.
Decker, Josephine J.	Norwalk	44.4
Decker, Manning	Norwalk	12.
Decker, Peter D.	Norwalk	320.
Decker, Sylvester P	Norwalk	146.
Delano, John L.	Portchester	3.
Delano, Thos. H.	New York	24.
De Waters, John H	Norwalk	121.6
De Waters & Stevens	Norwalk	154.
Dibble, Alphonso	Norwalk	115.8
Dibble, R. B	Norwalk	2.
Dibble, Stephen E	Norwalk	10.
Dorman, B. L.	Greenwich	6.
Eaton, Chas. N.	New Haven.	125 1
Elley, Janet	New Haven.	89.
Ellsworth J. & J. W.	New York	389.6
Farwell, Geo	Portchester	4.
Farwell, James	Portchester	19 1
Farwell, John	Portchester.	18.
Ferris, Geo. W	Greenwich	10.
Finiels, Louis	Greenwich	72.3
	Carried forward.....	13,312.1

Name.	Town.	Acres.
	Brought forward	13,312.1
Fitch, Henry R	Norwalk	28.
Forbes, C. B	Guilford	24.
Ford, Adolphus L	Greenwich	25.
Ford & Ryle	Stamford	78 7
Ford, A. Lincoln	Greenwich	28.
Ford, Claudia M	Greenwich	25.
Ford, Elbert L	Milford	164.
Ford & Swan	Bridgeport	103.3
Fordham, H. & Son	Greenport, L. I	118.
Fordham & Bell	Southington	100.
Fordham, Henry C	Stratford	50.
Fowler, John W	Milford	400.
Franklin, Delos L	New York	500.
Franklin, Zelus E., estate	Milford	100.
Frink, Nathan C	Branford	394.6
Frisbie, Nelson	New Haven	100.
Gager, Hans	Norwalk	10.
Galott, Geo. F	Fairfield	103.3
Garry, Mary O	Stratford	47.
Geib, A. A. & H. P	Norwalk	344.
Glahn, Miss Anna W., Von	New Haven	34.3
Godfrey, E. W	Norwalk	33.4
Godfrey, William	Norwalk	46.
Goodsell, Miller & Lewis	Bridgeport	317.7
Grindle, Richard H	New Haven	245.
Guilford Oyster Co	Boston	822.8
Hamilton, A. E	New Haven	33.
Hamilton, Geo. D	New Haven	155.
Hart & Raymond	Norwalk	15.5
Hassan, E. J	East Haven	13.5
Hawley, Wheeler	Bridgeport	145.7
Heath, Andrew	Norwalk	38.
Hilton, H. R	Norwalk	40.
Hitchcock, Frank I	Bridgeport	51.6
Hollins & Ott	Norwalk	26.9
Holly, Newman	Portchester	38.
Hopkins, C. F	Greenwich	4.
Hopkins, Judson W	Greenwich	20.
Hotchkiss, W. T	New York	73.
Howell, B. Frank	Norwalk	51.6
Hoyt, Chas. W. & Son	Bridgeport	543.
Hoyt, Gould	Norwalk	24.
Hoyt, W. F	Norwalk	29.7
Hoyt, Wm. H. & Son	Norwalk	890.9
Huested, G. F., estate	Greenwich	50.
Huested, J. E	Greenwich	5.
Huested, P. B	Camden, N. J.	10.
Hull, Chas. P., estate	Minneapolis	105.8
Hulse & Dunbar	New Haven	124.9
Hulse, Wm. C	Norwalk	43.7
Huntley, Perry C	Bridgeport	8.
Hurd, Chas. A	Bridgeport	86.6
Ives & Andrews	New Haven	11.
	Carried forward	20,192.6

Name.	Town.	Acres.
	Brought forward....	20,192 6
Johnson, H. St. Clair	New Haven	107.
Jones, Hannah	New Haven	86.
Judson & Whiting	Stratford	42.5
Kelsey, Edwin R	Branford	200.
Lafoe, W. E	New Haven	22.4
Lancraft Bros	New Haven	1,538.6
Lane & Linsley	New Haven	60.
Lane, Fred. A	New Haven	30.
Lane, Frank T	New Haven	150.
Lane, F. T. & F. A	New Haven	108.
Law, J. H. & S. B	New Haven	165.
Law, R. W	New Haven	188.
Law, R. W., Jr	New Haven	175.
Lewis, Henry J	Stratford	7,479.9
Lewis, Wm. A	Bridgeport	50.
Livearman, W. W	Darien	21.6
L'Hommedieu, J. S	Norwalk	10.
Lockwood & Hopkins	Greenwich	42.
Lockwood, Elbert F	Greenwich	974.7
Lockwood, S. B	Greenwich	8.9
Lockwood, Theron W	Norwalk	13.6
Lowndes, Charles	Norwalk	392.4
Lowndes, Chas. T	Norwalk	90.
Lowndes, John Henry	Norwalk	13.6
Lowndes, Stanley H	Norwalk	510.6
Lowndes, Theo. S	Norwalk	381.2
Ludington & Eaton	New Haven	50.
Ludington & Palmer	New Haven	443.
Lutz, Alexander	Greenwich	16.
Mallory, Geo. W	New Haven	150.
Maltby, C. S., estate	Greenwich	20.9
Mansfield, F. & Sons	New Haven	858 6
Marshall, Benj	Stamford	15.
Marshall, Enoch G. & Sons	Stamford	66.5
Marshall, Wilmot & Starkins	Greenwich	95.2
Martin, Geo. W. & Son	Portchester, N. Y	91.
Martin, Henry J	Portchester, N. Y	6.3
May, Jacob	Bridgeport	55.3
May Oyster Co	Bridgeport	1,185 9
McCrodden, Rowland & Redfern	Canarsie	96.3
McGuinness	Stamford	30.4
McGuire, estate	Portchester, N. Y	12.
McNeil & Carrington	New Haven	171.3
McNeil, Daniel	New Haven	40.
Mead, Daniel S., Jr., estate	Greenwich	114.5
Mead, Samuel	Norwalk	3.1
Meeks, Mrs. Peter A	New Haven	50.
Merwin, Francis E	Norwalk	4.5
Merwin, Samuel O	New Haven	64.6
Merwin, Wm. M. & Sons	Milford	2,148.
Miller, Anderania	New Haven	117.
Miller & Day	Stratford	299.8
Mills, E. B. & Co	Fairfield	51 6
	Carried forward....	39,310 4

Name.	Town.	Acres.
	Brought forward....	39,310.4
Millspaugh, E	Norwalk	10.
Moe, Wm. G	Norwalk	1 5
Moore, N. W., estate	New Haven	10.
Moore, William	Norwalk	51.
Morgan, H. P	Norwalk	5.
Morris, Julius A	New Haven	2.1
Morris, Louis S	Bridgeport	150.
Morris, Mrs. Margaret E	Bridgeport	109.
Morris, Marshall E	Bridgeport	1,219.9
Morrell, Wm	Greenwich	32.
Moss, Lincoln	New York	57.7
Nash, Chas. J	Black Rock	38.8
Nassau Oyster Co	Fairfield	179.
Newton, Henry G	New Haven	54.7
Newman, Chas	Greenwich	14.1
Newman, Oscar	Greenwich	10.1
Palmer, B. F	Greenwich	101.
Palmer, Chas. E	Greenwich	331.8
Palmer, Geo. A	Greenwich	48.2
Palmer, H. Ferris	Greenwich	18.
Palmer, Joseph G	Greenwich	63.4
Palmer, M. K. & H. J	Greenwich	20.
Palmer, Ralph A	Meriden	130.
Parmelee, C. D	New Haven	787.9
Parmelee, R. H	Norwalk	16.
Paush, Albert	Hartford	88.9
Peck, D. L., estate	Clinton	50.
Peters, Harry	Portchester	10.
Pfuderer, Chas. L., estate	New Haven	10.5
Plander, John H	Norwalk	2.
Post, G. E. & A. D	Keyport, N. J	121.8
Potter, Isaac L	New Haven	36.
Prior, A. M	Stamford	299.4
Raymond, Chas. W.	Darien	129.9
Raymond, Geo. W	Norwalk	10.
Raymond, Robert A	Darien	25.
Raymond, Wm. A	Norwalk	15.4
Reynolds, W. S	Greenwich	7.9
Reed, Wm. B	Norwalk	6.
Roberts, John	Norwalk	96.
Roberts, Nathan	Norwalk	12.
Roberts, Wm. O	Norwalk	12.
Rose & Ames	New Haven	25.
Rowe, B. N. & E. C	New Haven	50.
Rowe, Henry C	New Haven	7,828.2
Rowland, W. M. & Co	New Haven	417.
Royden, Wallace N.	Milford	30.
Sanford, P. G	Westport	387.
Searles, L. W	New York	24.
Seaman, Allen	New Haven	409.7
Sears, Wm. H	New Haven	100.
Seeley, C. Barnum	Bridgeport	10.
Selleck, Sands	Norwalk	15.
	Carried forward.....	53,000.3

Name.	Town.	Acres.
	Brought forward....	53,000.3
Selleck & Webb	Norwalk	12.7
Shaffer, Geo. H	New York	106.
Shaffer & James	Brooklyn, L. I.	320.1
Shepard, F. W	Branford	50.
Simmell, Francis X	Greenwich	58.
Smith Bros	Norwalk	100.
Smith & Benedict	New Haven	20.
Smith & Lane	New Haven	146.
Smith, Geo. H	New Haven	463.
Smith, J. & Sons	New Haven	2,572.5
Smith, Mrs. Julia	New Haven	38.
Smith, S. F. & W. M	New Haven	100.
Smith, M. P. & R. T	New Haven	200.
Smith Bros	New Haven	731.
Solman, Alden	Norwalk	752.9
Stanward & Moore	Westbrook	117.
Starkins, Samuel	Greenwich	74.5
Stevens, Aaron G	Norwalk	81.3
Stevens, A. G. & G. W	Norwalk	4.
Stevens, Geo. W	Norwalk	18.
Stevens, Wm. I	Norwalk	2,056.9
Stony Creek Oyster Co	Branford	33.
Stratford Oyster Co	Stratford	943.
Taylor, Hiram B	Norwalk	35.
Thomas, John	New Haven	12.5
Thomas, John & Thos	New Haven	362.3
Thomas, Thomas	New Haven	277.5
Thomes, Chas. F	Norwalk	96.
Thompson, Chas. E	New Haven	108.
Thompson & Bishop	New Haven	50.
Thompson, J. E. & Chas. E	New Haven	100
Tomlinson, Chas. A	Milford	200.
Townsend, Brown & Rowe	New Haven	98.
Townsend, Chas. H	New Haven	207.3
Townsend, Geo. H	New Haven	939.9
Traverse, H. I	Portchester	7.
Traverse, Isaac M	Portchester	31.
Turcott, Octave	New Haven	90.
Turpin, Emma L	Bridgeport	294.1
Tuthill, Alva B	Norwalk	279.
Van Name, Aaron	Norwalk	51.6
Vroom, Joseph	Norwalk	69.6
Walsh, Peter Henry	Greenwich	4.1
Ward, W. W	Orange	750.
Warren & Decker	Norwalk	80.
Waterhouse, C. R., Jr	New Haven	100.
Waterman, C. H	New York	146.6
Webb, Henry L	Norwalk	1.
Webb, C. H. & J. H	Darien	34.3
Wedmore & Barnes	New Haven	51.4
Wedmore & Rowe	New Haven	50.
Wedmore & Tuttle	New Haven	100.
Wells & Mead	Norwalk	83.3
	Carried forward....	66,707.7

Name.	Town.	Acres.
	Brought forward	66,707.7
West, P. F	Bridgeport	222.6
Westcott & Horton	Greenwich	16.
Whalley, Wm. L	Greenwich	10.
Wheeler, Frank	Meriden	400.
White, Merrill	New Haven	135.9
Wicks & Bassett	Norwalk	8.
Wicks, Daniel P	Norwalk	6.
Wicks, Geo. A. Hester	Norwalk	8.7
Wicks, Julia A	Norwalk	50.
Wiggins, Floyd E	New Haven	48.8
Williamson, Geo	Norwalk	6.
Willmott, Wm. H. & J. M	Darien	36.9
Wright, Thos	Norwalk	103.3
	Total	67,759.9

AMOUNT OF MATERIAL PUT ON OYSTER BEDS BY PROMINENT CULTIVATORS FOR THE SET OF 1894.

Cultivators.	Locality.	No. Bushels of Shells Planted.	No. Bushels of Crushed Stone Planted.	No. Bushels Long Island Gravel Planted.	No. Bushels of Gravel and Sand Dredged and Planted.	Estimated No. Bushels of Shell Harrowed Over for Set.	Total No. of Bushels Planted.
Isaac E. Brown	New Haven	25,000	.....	.....	272,000	30,000	327,000
Henry C. Rowe	" "	300,000	.....	.....	.....	.....	300,000
Barnes & Lane	" "	35,000	.....	.....	170,000	.....	205,000
J. Smith & Sons	" "	150,000	.....	.....	.....	50,000	200,000
Smith Bros	" "	155,000	.....	.....	.....	.....	155,000
Lancraft Bros	" "	165,000	.....	.....	.....	.....	165,000
F. Mansfield & Sons	" "	50,000	8,000	.....	30,000	.....	88,000
S. & J. Law	" "	50,000	.....	.....	.....	.....	50,000
R. W. & R. W. Law, Jr	" "	50,000	.....	.....	.....	.....	50,000
W. M. Rowland	" "	45,000	.....	.....	.....	.....	45,000
G. H. Smith	" "	40,000	.....	.....	.....	.....	40,000
Smith & Lane	" "	40,000	.....	.....	.....	.....	40,000
C. D. Parmelee	" "	35,000	.....	.....	.....	.....	35,000
Palmer & Ludington	" "	35,000	.....	.....	.....	.....	35,000
Hulse & Dunbar	" "	27,000	.....	.....	.....	.....	27,000
Wedmore & Rowe	" "	9,000	.....	.....	.....	.....	9,000
E. C. Rowe	" "	8,000	.....	.....	.....	.....	8,000
E. E. Ball	" "	7,000	.....	.....	.....	.....	7,000
John McNeil	" "	6,000	.....	.....	.....	.....	6,000
J. E. Bishop & Co	" "	6,000	.....	.....	.....	.....	6,000
S. L. Potter	" "	5,000	.....	.....	.....	.....	5,000
Potter & Hemingway	" "	5,000	.....	.....	.....	.....	5,000
S. & D. Chipman	" "	4,000	.....	.....	.....	.....	4,000
Bradley & Hemingway	" "	4,000	.....	.....	.....	.....	4,000
Thomas Thomas	" "	4,000	.....	.....	.....	.....	4,000
C. H. Seeley	" "	3,000	.....	.....	.....	.....	3,000
A. Moulthrop	" "	3,000	.....	.....	.....	.....	3,000
J. E. Thompson	" "	3,000	.....	.....	.....	.....	3,000
N. A. Ludington Co	" "	6,000	.....	.....	.....	.....	6,000
American Oyster Co	" "	30,000	.....	.....	.....	.....	30,000
	Total,	1,305,000	8,000	.....	472,000	80,000	1,865,000

AMOUNT OF MATERIAL PUT ON OYSTER BEDS BY PROMINENT CULTIVATORS.—CONTINUED.

CULTIVATORS.	LOCALITY.	No. Bushels of Shells Planted.	No. Bushels of Crushed Stone Planted.	No. Bushels Long Island Gravel Planted.	No. Bushels of Gravel and Sand Dredged and Planted.	Estimated No. Bushels of Shell Harrowed Over for Set.	Total No. of Bushels Planted.
W. M. Merwin & Son	Milford,	50,000	24,000	.....	340,000	.....	414,000
Stratford Oyster Co.	Stratford,	10,500	.....	.....	141,780	.....	152,280
H. J. Lewis	Bridgeport,	25,000	204,000	.....	.....	.....	229,000
M. E. Morris	"	56,000	.....	.....	170,000	.....	226,000
May Oyster Co	"	85,000	.....	.....	68,000	.....	153,000
Bond & Currier	"	35,000	.....	.....	.....	.....	35,000
Pierre F. West	"	23,000	.....	.....	.....	.....	23,000
W. I. Stevens	Norwalk,	65,000	60,000	7,500	.....	.....	132,500
W. H. Hoyt & Son	"	55,000	.....	.....	.....	.....	55,000
T. S Lowndes	"	50,000	.....	.....	.....	.....	50,000
Craw & L'Hommedieu	"	46,800	1,500	.....	.....	.....	48,300
Chas. T. Lowndes	"	35,000	.....	.....	.....	.....	35,000
A Solmons.	"	35,000	.....	.....	.....	.....	35,000
J. & J. W. Elsworth	"	25,000	.....	.....	.....	.....	25,000
Joseph Vroom	"	25,000	.....	.....	.....	.....	25,000
D. B. Decker	"	20,000	.....	.....	.....	.....	20,000
Peter Decker	"	20,000	.....	.....	.....	.....	20,000
S. H. Reed & Co	"	17,500	.....	.....	.....	.....	17,500
Gould Hoyt	"	10,000	.....	.....	.....	.....	10,000
C. W. Bell	"	10,000	.....	.....	.....	.....	10,000
Nassau Oyster Co.	Southport,	30,000	.....	.....	.....	.....	30,000
Mills & Co	"	6,000	.....	.....	.....	.....	6,000
W. A. Cumming	Stamford,	35,000	.....	.....	.....	.....	35,000
B. F. Palmer	Sound Beach,	10,000	.....	.....	.....	.....	10,000
C. E. Palmer	" "	5,000	.....	.....	.....	.....	5,000
H. S. Lockwood	Greenwich,	30,000	.....	.....	.....	.....	30,000
	Total,	814,800	289,500	7,500	719,780	.....	1,831,580
		1,305,000	8,000	.....	472,000	80,000	1,865,000
	Grand Total,	2,119,800	297,500	7,500	1,291,780	80,000	3,696,580

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Amateur	1	Wm. A. Lewis	Bridgeport	Wm. A. Lewis
S. E. Smith	2	Harriet J. Nash	Bridgeport	Charles J. Nash
D. G. Edsoll	3	Hulse & Dunbar	New Haven	Joshua Chappell
Simon Banks	4	Hart & Lee	Bridgeport	Aaron J. Hart
A. F. Beard	5	Walter Sprague	New York	Daniel Sprague
Libbie N	6	Joseph Ehlert	Bridgeport	Joseph Ehlert
Recreation	7	Walter N. Avery	New Haven	W. N. Avery
Echo	8	George D. Clark	Norwalk	George D. Clark
Mary	9	Frank I. Hitchcock	Bridgeport	Frank I. Hitchcock
Irene	10	Frank L. Mills	Bridgeport	F. L. Mills
Broadbill	11	Charles L. Lewis	Bridgeport	Charles L. Lewis
Eurge Yaunia	12	Karl Petterson	South Norwalk	Karl Petterson
Maida	13	Watson S. Wilmot	Bridgeport	Lawrence Layden
Artemesia	14	Charles W. Hoyt	Bridgeport	James F. Hoyt
Jennie	15	Wm. Wood, Jr	Darien	Wm. Wood, Jr
Parole	16	Samuel H. Danks	Bridgeport	Thomas Hinchey
Rescue	17	John Cihak	Bridgeport	John Cihak
Viking	18	Oliver Cook	Rowayton	Oliver Cook
Clarence	19	William M. Radfern	South Norwalk	Wm. M. Radfern
Alice	20	Robert M. Utz	Rowayton	R. M. Utz
Viola May	21	Wheeler Hawley	Bridgeport	Wheeler Hawley
Harry	22	Housatonic Oyster Co	Stratford	Samuel Wakelee
Loretta C	23	John H. Coleman	New Haven	John Coleman
Mary Lavinia	24	John McGuinness	Stamford	John McGuinness
Shelldrake	25	Edward L. Palmer	Bridgeport	Edward L. Palmer
Lottie	26	Martin W. Knowlton	Norwalk	M. W. Knowlton
Annie Frances	27	C. D. Parmelee	New Haven	Wm. Garrett
Azellia	28	Francis E. Merwin	South Norwalk	F. E. Merwin
Rambler	29	Henry P. Raymond	South Norwalk	Charles N. Raymond
Ella May	30	Frank F. Bishop	New Haven	F. F. Bishop
Edna	31	Joshua R. Jennings	South Norwalk	J. R. Jennings
Elsie M	32	Wm. G. Moe	Rowayton	Wm. G. Moe

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONTINUED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Lillian	33	Julia L. Crockett	Rowayton	Alfred S. Crockett
Lida May	34	George A. Wicks	Rowayton	George A. Wicks
Martha	35	Hans Gager	Rowayton	Hans Gager
Jessie E	36	Wm. P. Parlow	Bridgeport	William P. Parlow
Arrow	37	Charles H. Gehrmann	South Norwalk	Charles H. Gehrmann
Cora	38	Charles W. Remson	South Norwalk	Charles W. Remsen
James A. Hoyt	39	James W. Hoyt	South Norwalk	George A. Hoyt
Katydid	40	John Conklin, Sr.	East Norwalk	John Conklin, Jr
J. P. Z	41	J. P. Zeliffe	South Norwalk	R. L. Comstock
Emma Jane	42	Samuel Chard	Greenwich	William B. Chard
Piano	43	Samuel Chard	Greenwich	John A. Chard
Frances E. Webster	44	Samuel Chard	Greenwich	James Balcom
Gracie	45	John H. Plander	Rowayton	J. H. Plander
J. A. H	46	John A. Hall	Milford	John A. Hall
Ada Morton	47	George W. Ferris	Greenwich	George W. Ferris
Sadie E	48	Samuel Huested	Greenwich	Samuel Huested
Claudia M	49	A. Lincoln Ford	Greenwich	A. Lincoln Ford
Lizzie	50	H. P. Newman	Greenwich	H. P. Newman
Etta C	51	George A. Huested	Greenwich	Everett C. Hatter
Thistle	52	Frank Hollins	Rowayton	Frank Hollins
Rough and Ready	53	Charles E. Conklin	Greenport, N. Y	Ellsworth Champlain
Susie E	54	George H. Ackerly	Rowayton	George H. Ackerly
Eddie	55	John Ed. Johnson	Bridgeport	John Ed. Johnson
Henry R	56	Henry E. Walker	Rowayton	Henry E. Walker
Frances A	57	William Godfrey	South Norwalk	William Godfrey
Wave	58	Bazilar Egbert	South Norwalk	Bazilar Egbert
R. and H	59	Reed & Houseman	South Norwalk	B. P. Reed
Jarvis	60	Wm. H. Weed	South Norwalk	William H. Weed
Mary F	61	Samuel J. Ayres	South Norwalk	Samuel J. Ayres
Annie W	62	Clarence F. Mills	South Norwalk	Clarence F. Mills
Ada	63	William H. Tobey	South Norwalk	William H. Tobey
Phebe M	64	Abraham Decker	South Norwalk	Abraham Decker

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONTINUED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Willie	65	George W. Kinsey	South Norwalk	George W. Kinsey
Lillie	66	John Jarvis	Rowayton	John Jarvis
Heba	67	Edwin T. Tobey	South Norwalk	Edwin T. Tobey
Elsie A	68	Charles D. Tobey	South Norwalk	Charles D. Tobey
A. H. Purdy	69	Lawson & Martineau	South Norwalk	Aaron Martineau
Ida Florence	70	William Keene	South Norwalk	William R. Godfrey
Addie L	71	Bert Ayres	South Norwalk	Bert Ayres
Levinah	72	Lawson & Martineau	South Norwalk	Nelson Lawson
Ida May	73	Stanley Lowndes	South Norwalk	George B. Tallmadge
Willis B	74	William L. Ackerly	Rowayton	William L. Ackerly
Carrie O	75	George Felix	Bridgeport	Neil Anderson
Inspector	76	John Fahy	Stamford	John Fahy
Clarissa O	77	Charles N. Eaton	New Haven	Edward B. Eaton
Dan Sooy	78	Morris Hemingway	New Haven	Isaac S. Potter
Elk	79	Charles R. & Ed. Smith	Bridgeport	Charles R. Smith
Lizzie Arnot	80	Christian Billing	Bridgeport	Christian Billing
Loretta E. Coleman	81	John H. Coleman	New Haven	Frederick Rowe
Violet	82	Paragust Pierran	Bridgeport	Paragust Pierran
Eva B	83	Eva B. Lyle	South Norwalk	William E. Lyle
Libby H	84	Andrew Heath	South Norwalk	Andrew Heath
Sadie	85	William Ross	Norwalk	William Ross
Lydia H. Decker	86	Isaac E. Brown	New Haven	Fred. F. Brown
Hattie A. Wallace	87	Carrington & McNeil	New Haven	John P. McNeil
Minnie A	88	John W. Burrows	Greenwich	John W. Burrows
Lizzie Bell	89	Henry A. Irvine, Jr	Stamford	Henry A. Irvine, Jr
Empress	90	John Decker & Son	Stamford	John Decker, Jr
Ann Gertrude	91	B. F. Palmer	Greenwich	B. F. Palmer
Julian	92	William L. Whaley	Greenwich	William L. Whalley
Jennie Florence	93	Benjamin R. Wilmot	Greenwich	Orris S. H. Wilmot
A. R. Taylor	94	Benjamin R. Wilmot	Greenwich	Benjamin R. Wilmot
Dora Dane	95	F. X. Simmell	Greenwich	F. X. Simmell
Alice	96	Nathan E. Wilcox	Milford	Nathan E. Wilcox

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONTINUED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Carrie May	97	Daniel and Edward Burroughs	Bridgeport	Edward Burroughs
Zada	98	George N. Davis	Rowayton	George N. Davis
Mary Bell	99	M. K. and A. J. Palmer	Greenwich	Millard K. Palmer
Jennie L	100	William R. Lowndes	Rowayton	William R. Lowndes
Ella May	101	George Culver	Stratford	George Culver.
Grayling	102	George Rowland	Bridgeport	George Rowland
Ariel	103	Fred. M. Rowland	Bridgeport	Fred. M. Rowland
Ellen B	104	Fred. M. Rowland	Bridgeport	William H. Rowland
Neptune	105	Wallace N. Royden	Milford	Wallace N. Royden
Mary Amelia	106	Arthur & A. P. Sherwood	Westport	A. P. Sherwood
Gracie	107	Marchant Mitchell	Southport	Marchant Mitchell
Harry and Fred	108	H. S. Young	Rowayton	William W. Young
Cornelia A. Lowndes	109	William C. Hulse	Norwalk	William C. Hulse
Jessie	110	Pen Parnell	Greenwich	John Jay Moore
Emma	111	Charles H. Guider	Rowayton	Franklin Crocket
George D. Allen	112	John Thomas	New Haven	John Thomas
Belle Breckenridge	113	W. M. Rowland & Co	New Haven	John Page
James Bolton	114	Thomas E. Benedict	New Haven	Thomas E. Benedict
Leo	115	Daniel P. Wicks	Rowayton	D. P. Wicks
Jennie and Alice	116	Henry C. Fordham	Stratford	H. C. Fordham
Clara A. Palmer	117	Charles E. Palmer	Greenwich	Clarence E. Palmer
Teal	118	Frederick & E. Sturdevant	Bridgeport	Fred. E. Sturdevant
Addie	119	Egbert N. Hallock	Bridgeport	Egbert N. Hallock
Fannie S	120	Samuel Starkins	Greenwich	Samuel Starkins
Curlew	121	Oscar S. & Oliver S. Mills	Wilson's Point	Oscar S. Mills
Fannie	122	Garret F. Decker	South Norwalk	G. F. Decker
John H	123	Garret F. Decker	South Norwalk	G. F. Decker
Mabelle	124	Henry L. Case	Rowayton	H. L. Case
Caution	125	F. T. Lyon	South Norwalk	F. T. Lyon
Amy B. Cole	126	H. W. Cole	Rowayton	H. W. Cole
Alice	127	Westcott & Horton	Greenwich	Charles Westcott
Wave	128	Enoch Y. Marshall	Greenwich	E. Y. Marshall

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Hattie	129	O. S. Young	Rowayton	O. S. Young
Sneak	130	Stanley H. Lowndes	Rowayton	Andrew S. Mills
Benjamin Harrison	131	John Broadway	Rowayton	John Broadway
Tiger	132	Grant B. Rackett	Norwalk	Grant B. Rackett
Bessie	133	Edward N. Overton	Milford	E. N. Overton
Fearless	134	Charles A. Hurd	Bridgeport	Charles A. Hurd
Stanley Howard	135	Charles K. Wedmore	New Haven	Charles K. Wedmore
Dictator	136	Prior & Shaffer	Stamford	A. M. Prior
E. Pluribus Unum	137	A. M. Prior	Stamford	A. M. Prior
Rockie	138	Frisbie	Milford	C. H. Wilcox, Jr
Whistler	139	Charles A. Smith	Bridgeport	Charles A. Smith
Wasp	140	George W. Eisenmann	Bridgeport	George W. Eisenmann
Wicked Sal	141	Dennis L. Dowd	New Haven	Dennis L. Dowd
Jessie	142	Wilber Hine	Stratford	Nelson J. Wakelee
Christern	143	Henry W. Schmeelk, Jr	Greenwich	H. W. Schmeelk, Jr
Crystal Place	144	Sperry & Barnes	New Haven	Alonzo H. Shute
Pauline	145	John Reynolds	Bridgeport	Edwin W. Hawley
Molly Pitcher	146	William S McNeil	Bridgeport	Edward Eady
Ceres	147	E. P. Brockway	New London	Frederick H. Turpin
Julia A	148	Boucher & Langdon	Bridgeport	Frederick Langdon
Mary Underhill	149	Charles Jack	Bridgeport	James McTaggart
Nellie	150	Robert Carr	South Norwalk	Robert Carr
Jennie R	151	J. Smith & Sons	New Haven	John Cooper
Wave	152	Leopold J. Peterson	New Haven	L. J. Peterson
Idlewild	153	Willis E. Bell	South Norwalk	Willis E. Bell
Hattie R	154	George H. Shaffer	South Norwalk	John B. Rider
Mayflower	155	Charles Day	South Norwalk	Frank Day
Julia	156	William S. Smith	South Norwalk	William S. Smith
Mabel	157	F. & W. Keister	New Haven	Willie Keister
Samuel C. Bond	158	Ashabel A. Bond	Bridgeport	A. A. Bond
Elsie	159	Russell Sanford	Bridgeport	William D. Mills
Aurora	160	Joseph Lynch	Bridgeport	Joseph Lynch
Blue Rock	161	Charles Jack	Bridgeport	W. H. Austin
No Name	162	Leonard F. Tyler	Branford	L. F. Tyler
Fanchon	163	Willard E. Wiggins	New Haven	W. E. Wiggins

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONTINUED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Nellie C	164	Harry Newman	Greenwich	Harry Newman
Gladys	165	Willard H. Sweet	Milford	W. H. Sweet
Annie	166	Samuel J. Harrison	New Haven	Samuel J. Harrison
Antelope	167	Charles G. Fanning	Bridgeport	Frank Barlow
Louisa	168	Joseph G. Palmer	Greenwich	J. G. Palmer
Eva C	169	Clarence E. Liskom	Bridgeport	C. E. Liskom
Minnie Bell	170	John Halvorsen	Bridgeport	Gust. Mattson
Gertrude	171	George Thomas	Bridgeport	Charles R. Reynolds
Alice Chase	172	William H. Tinkham	Bridgeport	William H. Tinkham
Lulu	173	George A. Palmer	Greenwich	George A. Palmer
C. C. Stokum	174	Ryan & DeWolfe	Bridgeport	Richard Ryan
Jennie	175	Burnham & Pfau	Bridgeport	Edwin W. Mills
Smuggler	176	Samuel Peck	Bridgeport	Samuel Peck
Flyaway	177	John Thorn	Glenwood, N. Y.	John R. Wynns
A. Martineau	178	Washington M. Sharrott	South Norwalk	W. M. Sharrott
Elsie	179	Alexander Lofgren	Bridgeport	Alexander Lofgren
Jerome May	180	Pierre F. West	Bridgeport	Daniel G. Rider
Althea	181	Frederick L. Harral	Bridgeport	Frederick L. Harral
Stormy Petrel	182	George Richardson	Stratford	George W. Merrill
Jennie L	183	Theron W. Lockwood	Rowayton	Theron W. Lockwood
DeWitt	184	William Wallgrain	South Norwalk	William Wallgrain
Haze	185	Ira E. Petty	Rowayton	Ira E. Petty
Flight	186	J. H. & J. V. Monsell	Rowayton	Joseph V. Monsell
Lady Emma	187	Charles H. Hoyt	Greenwich	Charles H. Hoyt
Columbus	188	Andrew N. Smith	Madison	Andrew Norman Smith
Josephine Chapin	189	J. C. Hawkins	Rowayton	P. F. Boerum
Jennie R	190	Adolphus L. Ford	Greenwich	Adolphus L. Ford
Nevada	191	Romeo E. Bassett	Madison	William E. Bassett
Star	192	John Ryle	Stamford	John Ryle
Ellen	193	John Farewell	Greenwich	George Farewell
Bertie	194	Judson W. Hopkins	Greenwich	J. W. Hopkins
Hattie L	195	John R. Hutton	Darien	John R. Hutton
Anchor	196	Adolf Vautler	Bridgeport	Adolf Vautler
Surprise	197	Joseph R. Raymond	South Norwalk	William Avery
Ellen F	198	Mrs. Ellen S. Eaton	New Haven	Edward B. Eaton

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONTINUED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Arkansas Traveller	199	Henry Cutbill	Rowayton	Henry Cutbill
Belle	200	Charles W. Bell	Rowayton	Charles W. Bell
F. C. Smith	201	Charles Fancher	Black Rock	Edwin W. Hawley
Windward	202	B. F. Hastings	Bridgeport	B. F. Hastings
Katie Akin	203	Fred. Olsen	South Norwalk	Daniel P. Morrell
Jennie V	204	Mary G. Rider	South Norwalk	John B. Rider
Ally Ray	205	Charles W. Ford	Greenwich	Charles W. Ford
Guiding Star	206	M. F. McComb	Greenwich	George Marshall
Pell	207	M. J. Decker	Norwalk	M. J. Decker
Mystery	208	John F. Wilbank	Bridgeport	George N. Evans
Laura V	209	Fillmore Baker	Stratford	Charles D. Wicks
Susie C	210	Samuel Chard	Greenwich	Stanley Chard
Alida	211	G. W. Mattson	Stratford	G. W. Mattson
Martin M. Mott	212	Oscar Newman	Greenwich	Oscar Newman
Irene	213	Addison Palmer	Greenwich	Addison Palmer
Lizzie	214	Charles E. Palmer	Greenwich	Elmer F. Dayton
Florence	215	Daniel Velsor	Oyster Bay, N. Y	A. J. Hart
Bradley	216	William D. Smith	Bridgeport	William D. Smith
Lucia	217	James M. Willmott	Darien	James M. Willmott
Mosetta H	218	Preston Hart	Rowayton	Preston Hart
Clara	219	Evans & Grier	Bridgeport	Frederick Smith
Ino	220	Edward H. Thompson	Stratford	Edward H. Thompson
Emma C	221	A. H. Lowden	Bridgeport	Vernon W. Lowden
Pearl	222	Henry Sturdevant	Bridgeport	Henry Sturdevant
Pauline S	223	Warren B. Shepard	New Haven	Warren B. Shepard
Carrie	224	John Bowen	Bridgeport	John Bowen
Belleport	225	William M. Merwin & Sons	Milford	Frank Brown
Ruth	226	Edward W. Haines	West Haven	Edward W. Haines
Island Belle	227	James N. Sisson	Stonington	James N. Sisson
Edith R	228	Rasmus Rasmussen	New Haven	Rasmus Rasmussen
Ellen B., 2d	229	Thomas Chapman	Bridgeport	Thomas Chapman
Rachael	230	Harry Hunter	Norwalk	Harry Hunter
Westchester	231	Edward Ayers	Bridgeport	Edward Ayers
Leona	232	John Shumacher	Greenwich	John A. Morrison
Frank	233	Eli Bradley	Saugatuck	Eli Bradley

LIST OF VESSELS LICENSED TO WORK UPON THE CONNECTICUT NATURAL OYSTER BEDS.—CONCLUDED.

Name of Vessel.	No.	Name of Owner.	Hailing Place.	Captain.
Celia May	234	Thomas E. Hemstock	New Haven	Thomas E. Hemstock
Ethel May	235	Charles W. Mills	Bridgeport	Charles W. Mills
Lucy A. Lane	236	Edward B. Palmer	Stamford	Edward B. Palmer
Jennie	237	William E. Burnham	Bridgeport	Andrew Billings
Magnolia	238	Charles A. Bradley	Bridgeport	Albert A. Bradley
Flora Temple	239	C. H. Knapp	Greenwich	C. H. Knapp
Ada	240	Gilbert Hopkins	Greenwich	Gilbert Hopkins
Alice	241	John F. Larraby	New Haven	John F. Larraby
Cecilia R	242	Edward H. White	Rowayton	Fay O. White
Pansey	243	Frederick Marberg	Fairfield	Frederick Marberg
Anna W	244	Hannah Jones	New Haven	Edward R. Christie
Harvey N	245	Samuel Thorne	Glenwood, L. I.	John Jarvis
Elsie B	246	Elisha H. Lyons	Branford	Elisha H. Lyons
Witch	247	John Bradley	New Haven	Thomas E. Benedict
Eagle	248	Alden Sohnans	Rowayton	John H. Munsell
James Kirby	249	Fred. F. Ehrsam	Bridgeport	William T. Dennis
Jessie R	250	W. M. Rouland	New Haven	William Page
Seabird	251	Caleb Wood	East Norwalk	Caleb Wood
Nena A. Rowland	252	H. Rouland	South Norwalk	Victor Saunders
Wild Pigeon	253	Frank Wheeler	New Haven	Charles Barnes
Addie Watts	254	Sarah A. Lockwood	Bridgeport	James F. Hoyt
Nellie	255	John Nelson	South Norwalk	William G. Olmsted
Nidus	256	James Black	Bridgeport	Frank Burroughs
Addie R	257	Hollins & DeWaters	Norwalk	John H. DeWaters
Effie May	258	William S. Barnes	New Haven	Wm. S. Merrill
Sunny Side	259	Charles E. Anderson	New Haven	Charles E. Anderson
Sea Bird	260	Charles W. Blydenburgh	Norwalk	Chas. W. Blydenburgh
The Oyster	261	C. W. Hoyt & Sons	Bridgeport	C. B. Hoyt
Princess	262	Stephen H. Miner	Rowayton	Stephen H. Miner
Alice C	263	Henry J. Lewis	Stratford	John A. Holmberg
Lottie K	264	Edwin R. Kelsey	Branford	Gilbert Eaton
Rattler	265	Patrick Moran	Bridgeport	Charles E. Hankins
Ella	266	Kerin Ward	Bridgeport	George Linscott
Wave	267	John Christiansen	New Haven	John Christiansen
Mary A	268	George M. Gould	Bridgeport	George M. Gould

APPENDIX.

The following are the designations of the natural beds of Connecticut as defined by the Commission, the Courts, and the Legislature, and made a portion of the General Statutes of the State :

CORMELL REEF NATURAL BED.

The southern point of this bed is the point which is two thousand five hundred and fifty-five feet due north of a point which is one thousand nine hundred and twenty-two feet due west of the center of the tower of Great Captains Island light-house. The said southern point is also determined by the following sextant angles : Little Captains Island coast survey signal to Americus, 64° 27′ ; Americus to Mead, 84° 16′ ; Americus to Portchester spire (Methodist), 82° 56′. From the said southern point the eastern boundary line runs north twenty-eight degrees east, true meridian, seven hundred feet, to buoy known as 1002 in commissioners' buoy records, and determined by the following sextant angles : Little Captains Island coast survey signal to Americus, 70° 47′ ; Americus to Mead, 90° 03′ ; Mead to Great Captains Island light-house, 139° 15′. The following ranges pertain to this point : first, Daniel Lyon, Jr.'s, house on with High-water rock ; second, sharp top tree in woods showing above all the woods, on with dock at the Americus club-house. Thence north thirteen degrees east, true meridian, one hundred and ninety feet to buoy known as 1003 in commissioners' buoy records, and determined by the following sextant angles : Little Captains Island coast survey signal to Americus, 72° 27′ ; Americus to Mead, 92° 00 ; Mead to Great Captains Island light-house, 135° 27′. The following ranges pertain to this point : first, Methodist spire on with west end of sand beach on Calves Island ; second, Rye Beach hotel on with gap or cut in Jones' stones. Thence north sixty-six degrees west, true meridian, four hundred and thirty-five feet to buoy known as 998 in commissioners' buoy records, and determined by the following sextant angles : Little Captains Island coast survey signal to Americus, 70° 25′ ; Americus to Mead, 95° 43′ ; Mead to Great Captains Island light-house, 139° 05′. The following ranges pertain to this

point : first, gap in woods on with white rock on south end of Calves Island ; second, clump of woods on Long Island on with west bluff of bank on Great Captains Island. Thence south fifty-one degrees and fifteen minutes west, true meridian, nine hundred and ten feet to a point determined by the following sextant angles : Little Captains Island coast survey signal to Americus, 62° 20′ ; Americus to Mead, 90° 14′ ; Americus to Portchester spire (Methodist), 88° 42′. Thence south five degrees and fifteen minutes west, true meridian, two hundred and fifteen feet to buoy known as 1023 in commissioners' buoy records, and determined by the following sextant angles : Great Captains Island light-house to Americus, 107° 42 ; Americus to Calf, 110° 27′ ; Summer-house to Great Captains Island light-house, 107° 27′. The following ranges pertain to this point : first, barn just south of bush's woods just open to the south of barn on Bower's Island ; second, south edge of stone house on with white stone near the south end of Calves Island. Thence south seventy-five degrees and twenty minutes east, true meridian, seven hundred and seventy-five feet to the point of beginning. The area comprised is fifteen acres.

PORTCHESTER BED.

Beginning at the northern point of the bed, said point being the southeast corner of ground of Isaac Martin. The said point is known as buoy number 479 in commissioners' buoy records, and is determined by the following sextant angles : Summer-house to Calf, 131° 17′ ; Calf to Mead, 76° 54′ ; Summer-house to Great Captains Island light-house, 100° 40′ ; Great Captains Island light-house to Horse-Neck spire, 84° 00′. The following ranges pertain to this point : first, the north side of Clifford's house opens about fifty feet west of the west side of Black Tom rocks ; second, the south side of bathing-house of Edward Schell is in line with the north side of the high rock of the Black Tom rocks. (The bathing-house stands on the main shore southwest of the steamboat dock at Portchester.) From the said northern point the northern boundary line runs south sixty-five degrees and fifteen minutes west, true meridian, across the highest part of Beach Rock to the shore. The point on Beach Rock is determined by the following sextant angles: Summer-house to Calf, 121° 38′ ; Calf to Horse Neck spire, 47° 54′; Summer-house to Great Captains Island light-house, 92° 08′. From the said northern point, the eastern boundary line runs south fifty-three degrees and thirty-five minutes east, true meridian, eight hundred and ninety feet, to buoy 481, at the south corner of the ground

of George W. Martin. Thence south sixty-four degrees east, true meridian, one thousand eight hundred and fifty feet, to buoy 482. This point is determined by the following ranges : first, cupola of Abendroth's house over slim cedar tree, the west one of several, standing on the mainland and near the shore ; second, the south side of woods on Rye Point, in line with bottom of bluff on south end of Manursing Island. Thence south sixty-six degrees and forty-five minutes east, true meridian, eight hundred and seventy-five feet to buoy 1076, the same being the south corner of ground of George Martin and Sons. Thence south four degrees west, true meridian, six hundred and eighty feet to buoy 514, at the north corner of ground of David B. Chard. This point is determined by the following ranges : first, bluff on Lloyd's Neck on with high-water mark at west end of Great Captains Island ; second, liberty cap on large white boulder at the extreme west end of Brush Island over spindle on Jones' stones. Thence south thirty-one degrees and fifty minutes west, true meridian, along last mentioned range-line along ground of David B. Chard and on public domain, one thousand eight hundred and fifteen feet. Thence north sixty-seven degrees and fifteen minutes west, true meridian, one thousand four hundred and fifteen feet, in a line passing through buoys 489 and 490, and ranging : first, south side of a large tree on hill on with two cedar trees standing at the shore and nearly in line, and also in line with north end of steamboat dock. Thence north thirty-one degrees east, true meridian, three hundred and eighty-five feet along ground owned or occupied by William Maguire to buoy 510. Thence north fifty-nine degrees and twelve minutes west, true meridian, one thousand four hundred and eighty feet to Big Captains Island rock. This line ranges south chimney of Brooks' house over cedar bush stuck on the Big Captains Island rock. The said rock is known in commissioners' buoy book records as position 486. Thence north fifty-five degrees west, true meridian, one thousand seven hundred and sixty feet to position 478, the same being a hole drilled near the center of the outer rock at Bryam Point. A cedar bush stands in the hole. Thence northerly along the east bank of Bryam Point to intersect the northern boundary line of the bed. The area of this bed is two hundred and eighteen acres.

The following sextant angles are of record as determining the positions and points mentioned in the preceding description, namely :

481—Summer-house to Great Captains Island light-house, 117° 42′; Great Captains' Island light-house to Horse Neck spire, 84° 30′; Great Captains Island light-house to Mayo, 82° 10′.

482—Great Captains Island light-house to Calf, 97° 31′; Calf to Summer-house, 117° 26′; Great Captains Island light-house to Mayo, 89° 07′.

1076—Great Captains Island light-house to Mayo, 91° 46′; Mayo to Summer-house, 113° 44′; Great Captains Island light-house to Calf, 116° 07′.

514—Great Captains Island light-house to Calf, 102° 47′; Calf to Summer-house, 86° 11′; Great Captains Island light-house to Rock, 66° 41′; Rock to Mead, 54° 21′.

489—Great Captains Island light-house to Calf, 69° 29′; Calf to Rye spire, 103° 09′.

490—Great Captains Island light-house to Calf, 62° 44′; Calf to Summer-house, 97° 33′.

510—Great Captains Island light-house to calf, 62° 43′; Calf to Summer house, 111° 42′; Great Captains Island light-house to Mead, 94° 33′; Mead to Summer-house, 79° 49′.

486—Great Captains Island light-house to Mead, 88° 50′; Mead to Summer house, 119° 01′.

478—Summer-house to Great Captains Island light-house, 83° 00′; Great Captains Island light-house to Horse Neck spire, 70° 30′; Great Captains Island light-house to Mayo, 64° 25′.

GREAT CAPTAINS ISLAND NATURAL BED.

Beginning at the point of intersection of a line due east of the Great Captains Island light-house, with a line ranging northerly and southerly over the steeple of the Methodist church in Greenwich and the west end of the building standing near the end of the steamboat dock; thence running southerly along the last-mentioned line about one thousand four hundred feet to a point of its intersection with a line ranging over a gap in the high woods, which are north and east of Reuben B. Lockwood's house in old Greenwich, or Sound Beach, and low-water mark southeast of the clump on Little Captains Island. This point, known as number 521 in commissioners' buoy book, is determined by the following sextant angles, namely: Stamford light-house to Horse-Neck spire, 62° 19′; Horse Neck spire to Rye spire, 91° 13′; Stamford light-house to Americus, 59° 17′; Americus to Bloomer, 59° 24′. Thence running westerly on a straight line to a point formed at the intersection

of two lines, one ranging over the north side of the high part of the Rye Beach hotel and the south side of the gap in the woods on a distant hill in Rye, and the other ranging over the spire of the Second Congregational church at Greenwich and a small elm tree on the west end of Great Captains Island. This point, known in commissioners' buoy book as number 421, is determined by the following sextant angles: Little Captains Island to Calf, 67° 03′; Calf to Summer-house, 42° 39′; Stamford light-house to Mayo, 61° 27′; Mayo to Rye spire, 84° 06′. The west side of the bed follows the last-mentioned range line to the high-water line on the south side of Great Captains Island; thence easterly following said high-water line, to a point which is due east from the center of the tower of the Great Captains Island light-house; and thence due east to the point of beginning. The area of this bed is one hundred and fifty-two acres.

FIELD POINT NATURAL BED.

Beginning at a point in the commissioners' line of jurisdiction, where it is intersected by a line ranging over the steeple of the Second Congregational church at Greenwich and the extreme east end of the "marble house," formerly used as a marble factory, which stands near the steamboat dock; running thence southerly along said range line to its point of intersection known in commissioners' buoy book as number 453, with a line ranging westerly over the church spire at Rye, N. Y., and the south gable of the westernmost house on Calf Island. Said point is determined by the following sextant angles: Americus to Mead, 99° 20′; Mead to Great Captains Island light-house, 82° 30′; Horse Neck spire to Portchester spire, 77° 29′; Portchester spire to Great Captains Island light-house, 93° 30′. Thence running easterly to a point known in commissioners' buoy book as number 455, formed at the intersection of two lines; one line ranging westerly over a large tree in Port chester and the center of the eastern house on Calf Island (a slim cedar tree is in the same range), and the other line ranging northerly over the steeple of the Second Congregational church at Greenwich and the west side of Black Rock, west of the Americus house. This point may be found by the following sextant angles: Americus to Mead, 90° 15′; Mead to Great Captains Island light-house, 75° 27′; Horse Neck spire to Portchester spire, 75° 11′; Portchester spire to Great Captains Island light-house, 86° 00′. Thence running southwesterly to a point.

known in commissioners' buoy book as number 456, formed at the intersection of three lines ; the first line ranging westerly over the northeast corner of the north house on Calf Island and the north cedar tree at the shore on the east side of Calf Island ; the second line ranging also westerly over the south edge of the Brooks house and the north side of the shed which stands northeast of the barns on Calf Island ; and the third line ranging northerly over the steeple of the Second Congregational church at Greenwich and the flagpole on the west end of Caleb Holmes' storehouse. This point is determined by the following sextant angles : Americus to Mead, 98° 54′; Mead to Great Captains Island light house, 93° 55′; Horse Neck spire to Portchester spire, 75° 48′ 30″; Portchester spire to Great Captains Island light house, 103° 48′. Thence running northwesterly to a point, known in commissioners' buoy book as number 457, formed at the intersection of two lines ; one line ranging over Lloyd's Neck bluff on the east side of the east clump at Little Captains Island, at about half the height of the clump, and the other line ranging over the east end of the dining-room of the Americus House and the center of the white rock at the extreme south end of Field Point. This point is determined by the following sextant angles : Little Captain commissioners' signal to Americus, 87° 27′; Americus to Mead, 128° 37′; Americus to Portchester spire, 113° 37′; Portchester spire to Great Captains Island light-house, 118° 46′. Thence running northerly to the line of jurisdiction between the State and town in the direction of a point, known in commissioners' buoy book as number 458, formed at the intersection of two ranged lines, one running easterly over the high part of the bluff on the north side of Little Horseshoe in Cos Cob harbor and the point where the black and white rocks on the extreme southeast end of Field Point come together ; and the other line running westerly over the north side of the old Benjamin Merritt house, just clear of the cedars and the southwest end of Otter Rocks. This point is a little north of said line of jurisdiction, and is determined by the following sextant angles : Stamford light-house to Great Captains Island light-house, 87° 04′; Great Captains Island light-house to Bloomer, 107° 06′; Great Captains Island light-house to Portchester spire, 110° 57′. The northern side of this bed follows the line of jurisdiction between the State and town. The area of this bed is eighty-four acres.

GREENWICH POINT NATURAL BED.

Beginning at a point at the intersection of the line of jurisdiction between State and town with a line ranging Seth Quintard's house over Ami Ferris's old house; thence running southerly on said range line to its point of intersection with a line ranging westerly ever a round-topped tree in Rye and the south side of Great Captains Island at low water; thence westerly along said last-mentioned range line to its point of intersection with a line ranging about northwesterly over the steeple of the Second Congregational church at Greenwich, opening west of Flat Neck woods; thence northwesterly along the last-mentioned range line to where it intersects the line of jurisdiction between the State and town; thence easterly along said line to the point of beginning. The eastern line of the bed is a line which passes through two points which are determined by the following sextant angles, namely: First point: Stamford light-house to Greenwich Point, 105° 49′ 20″; Greenwich Point to Great Captains Island light-house, 52° 17′; Stamford light-house to Horse Neck spire, 99° 13′; Horse Neck spire to Great Captains Island light-house, 58° 57′. Second point: Stamford light-house to Greenwich Point, 82° 35′; Greenwich Point to Great Captains Island light-house, 63° 32′; Stamford light-house to Horse Neck spire, 88° 59′; Horse Neck spire to Great Captains Island light-house, 57° 04′. The southern line of the bed is a line which passes through two points which are determined by the following sextant angles: First point: Stamford light-house to Horse Neck spire, 82° 38′ 30″; Horse Neck spire to Great Captains Island light-house, 55° 38′. Second point: Stamford light-house to Horse Neck spire, 84° 43′; Horse Neck spire to Great Captains Island light-house, 61° 05′; Stamford light-house to Greenwich Point, 47° 23′; Greenwich Point to Great Captains Island light-house, 98° 24′. The point last given is the southwest corner of the bed. The area comprised is four hundred and three acres.

FAIRFIELD BAR AND FAIRFIELD NATURAL BEDS.

These two beds are contiguous, and the portions thereof within State jurisdiction are as follows: Beginning at the center of the tower of the Penfield Reef light-house, and starting from this point as the southeast corner of these beds, the southern boundary line runs south eighty-one degrees and twenty-four minutes west, true meridian, eleven thousand five hundred and fifteen feet to the extreme south point of the three large flat rocks at the southern end

of Sunken Island. Said point is located by the following sextant angles: Penfield Reef light-house to Episcopal spire in Fairfield, 63° 10′; Episcopal spire in Fairfield to Jennings' house, 90° 26′; thence due west twelve thousand three hundred and twenty-three feet to a rock known as "the fishing rock." Said rock is situated southerly of Farms Point, and is determined by the following sextant angles: Scott's house to Jennings' house, 38° 47′; Jennings' house to Burnham's barn, 111° 11′; Scott's house to Farms Point, 74° 53′; thence from "the fishing rock" due north to the commissioners line of jurisdiction; thence easterly along said line of jurisdiction to Pine Creek Point; thence, still following the said line of jurisdiction to Shoal Point; thence along the Fairfield bar to a point due north of the center of the tower of the Penfield Reef light-house; thence due south to the point of beginning. The area comprised is one thousand two hundred and thirty-seven acres.

BRIDGEPORT NATURAL BED.

The part in State jurisdiction is described as follows: The southeast corner of this bed is the point which is three hundred and sixteen feet due east of a point which is one thousand one hundred and thirty-two feet due south of the center of the tower of the Bridgeport light-house. The said southeast corner is the northeast corner of ground of David N Armstrong. From said southeast corner the southern boundary line runs due west along ground of said Armstrong, a distance of one thousand nine hundred and thirty feet, to a point which has the following ranges: first, Black Rock light-house over the center of the woods on Wakeman's Island; second, soldiers' monument over the center of the grain elevator; thence northerly along the last-mentioned range line and along ground of Charles H. Armstrong, a distance of six hundred feet; thence south sixty-four degrees and fifty-seven minutes west, true meridian, four thousand one hundred and twenty feet along ground of said Armstrong; thence due south six hundred and sixteen feet along ground of said Armstrong to the northwest corner of ground of Wheeler Hawley; thence south sixty-four degrees and fifty-seven minutes west, true meridian, one hundred and seventy feet along ground of Charles J. Nash. (The said bearing ranges Black Rock light-house over the center of the woods on Wakeman's Island.) Thence south nine degrees west, true meridian, five hundred and eighty feet along ground of said Nash; thence south thirty-four degrees and fifty-two minutes west, true meridian, one thousand three hundred

and twenty feet along ground of said Nash ; thence south eighty-one degrees and forty-five minutes west, true meridian, three thousand seven hundred and twenty feet in a direct line towards the Black Rock light-house to the east shore of Fayerweather's Island at the high-water line ; thence northerly along said east shore about four hundred and fifty feet to the line of jurisdiction between the State and town ; thence northeasterly along said line of jurisdiction nine thousand four hundred and twenty feet to the extreme south point of the sea wall at Seaside Park ; thence southeasterly along said line of jurisdiction two thousand eight hundred and seventy-five feet ; thence due south one thousand three hundred and fifty feet to the point of beginning. The area thus comprised is three hundred and thirty-four acres.

STRATFORD NATURAL BED.

Beginning at a point in the commissioners' line of jurisdiction, distant about one thousand eight hundred and thirty feet northeasterly from the center of the tower of the new Stratford Point light-house ; thence running due south to a point which is determined by the following sextant angles : "Fish" to Stratford Point light-house, 105° 47′; Stratford Point light-house to Middle Ground light-house, 114° 26′; Stratford Point light-house to Penfield Reef light-house, 45° 11′. ("Fish" is the factory chimney of the oil works at Welch's Point.) The point thus located is the southeast corner of the bed, and it may also be found by intersecting the following range lines : One range line running northerly along the edge of the roof on the easterly side of the light-house keeper's new house, near the Stratford Point light-house ; the other range line running northeasterly over the southeast side or face of the old hotel on Charles Island, and a tall, prominent tree at the left side of a little gap in the woods on the northern slope of a distant hill. This gap may be found by beginning at the fish works at Welch's Point and looking northerly along the crest of hills until you pass four prominent single trees, which rise above the top of the general wood line. The fourth tree stands near the right hand side of the gap. At the said southeast corner, the compass bearing to the tower of the Stratford Point light-house, is northwest by west, and the distance to the same is one thousand four hundred and sixty feet ; thence from said southeast corner running in a southwesterly direction a distance of twelve thousand two hundred and fifty feet to a point which is determined by the following sextant angles : Penfield Reef light-

house to Middle Ground light-house, 99° 07′ 30″; Middle Ground light house to Stratford Point light-house, 115° 27′; Stratford Point light-house to Bridgeport light-house, 97° 07′; Bridgeport light-house to Penfield Reef light-house, 48° 18′. The approximate compass bearing of this line is southwest by west three-eighths west. The terminal point of this line is the extreme south point of the bed, and is also further determined by the intersection of the following range lines: Northerly, over Ambler's house at Nicholls Farms, Trumbull, and the middle poplar of the five poplar trees near the shore at Point-no-point, on what is termed the Lordship farm. The compass bearing of this range line is north by east. Northwesterly, over cupola of P. T. Barnum's house at Bridgeport, and the center of the dwelling-house attached to the Bridgeport light-house. Northwesterly again, over the cupola of Dr. Warner's house at Seaside Park, Bridgeport, and the west tree of five single trees on a ridge in the distance. The compass bearing of this range is northwest one-half north. Thence running northwesterly on a line in the direction of the spire of the Congregational church at Fairfield, a distance of thirteen thousand eight hundred and thirty feet, to its point of intersection with a line ranging northerly over the factory chimney of the Read Carpet Company at Bridgeport and the Soldiers' Monument at Seaside Park. Thence northerly along said last-mentioned range line to ground designated to Robert E. DeForest; thence due east to southeast corner of said designation; thence due north to the commissioners' line of jurisdiction; thence easterly along said line to the point of beginning. The area comprised is three thousand and fifty-five acres.

ROTON POINT AND FISH ISLAND NATURAL BEDS.

The part in State jurisdiction is described as follows: The northeast corner is a point which is thirty-five feet due south of a copper bolt set at the extreme south end of Bell Island. Said bolt is a triangulation station and is known as "Bell Island." From said northeast corner the northern boundary line runs south eighty-one degrees and twelve minutes west along the commissioners' line of jurisdiction in the direction of the position known of record in the buoy records as 1954, a distance of five thousand eight hundred and sixty-five feet to the east line of ground of Oliver Cook. (Said east line starting from a position known of record in the buoy records as number 1882, *i e.*, the extreme east edge of Moll's rock showing at low

water, and running to position 1887, *i. e.*, the extreme east edge of Peat's rocks at low water.) Thence south twenty-three degrees and fifteen minutes west and passing through position 1887, one thousand five hundred and eighty-five feet to position 1892. (Said position 1892 being the northeast corner of rocks on Fish Island at low water.) Thence south twenty-seven degrees and forty-five minutes west seven hundred and twenty feet to buoy 1234 at the northeast corner of ground of William I. Stevens ; thence south four degrees and forty-five minutes west five hundred and twenty feet, to buoy 1191 at the southeast corner of said Stevens' ground ; thence north seventy-four degrees and sixteen minutes east three thousand five hundred and sixty feet, to position 1900; thence north seventy-eight degrees and seven minutes east two thousand nine hundred and fifty-five feet, to buoy 1175 at the southwest corner of Charles W. Bell ; thence north twenty-seven degrees east six hundred and fifteen feet, to buoy 1176 ; thence south seventy-three degrees east three hundred and forty feet, to buoy 1466 ; thence north twenty-two degrees and thirty minutes east one thousand and twenty feet to the commissioners' line of jurisdiction, said bearing being in line with buoy 1873; thence north forty-three degrees and thirty minutes west along said line of jurisdiction seven hundred and sixty feet to the point of beginning. All bearings are true meridian. The area comprised is three hundred and seven acres.

The following sextant angles determine the positions and points mentioned in the preceding description, namely :

1954—Collender to Cedar Tree (Fish Island), 79° 15′; Cedar Tree (Fish Island) to Bell Island, 71° 05′; Cedar Tree (Fish Island) to Norwalk light-house, 55° 49′.

1882—Collender to Cedar Tree (Fish Island), 28° 30′; Cedar Tree (Fish Island) to Norwalk light-house, 105° 40′; Cedar Tree (Fish Island) to Norwalk Spindle, 92° 44′; Norwalk Spindle to Pike, 60° 50′.

1887—Bell Island to Centennial, 100° 20′; Centennial to Collender, 91° 19′; Norwalk Spindle to Pike, 63° 58′.

1892—Norwalk Spindle to Pike, 63° 10′; Pike to Centennial, 49° 08′; Norwalk light-house to Pike, 51° 31′.

1534—Norwalk light-house to Centennial, 86° 24′; Centennial to Collender, 110° 48′; Bell Island to Centennial, 65° 23′.

1191—Norwalk light-house to Colyer, 82° 59′; Colyer to Collender, 106° 47′; Norwalk Spindle to Bell Island, 32° 29′.

1900—Chimons to Pike, 72° 19′; Pike to Collender, 97° 55′; Tavern Island to Pike, 62° 51′.

1175—Norwalk light-house to Bell Island, 82° 41′; Bell Island to Colyer, 91° 49′; Chimons to Bell Island, 48° 23′; Bell Island to Collender, 118° 02′.

1176—Norwalk light-house to Bell Island, 96° 14′; Bell Island to Colyer, 91° 08′; Chimons to Bell Island, 55° 53′; Bell Island to Collender, 114° 07′.

1466—Chimons to Bell Island, 67° 26′; Bell Island to Centennial, 77° 54′; Norwalk light-house to Depot, 89° 10′.

1873—Chimons to Depot, 53° 41′; Depot to Centennial, 103° 07′; Chimons to Bell Island, 110° 43′.

State of Connecticut.

EIGHTH ANNUAL REPORT

OF THE

INSPECTOR OF FACTORIES

OF THE

STATE OF CONNECTICUT,

FOR THE

YEAR ENDING NOVEMBER 30, 1894.

NEW BRITAIN, CONN.:
HERALD PUBLISHING COMPANY, PRINTERS, 67 CHURCH STREET.
1894.

State of Connecticut.

OFFICE OF INSPECTOR OF FACTORIES,
HARTFORD, CONN., December 1, 1894.

To his Excellency LUZON B. MORRIS, *Governor of the State of Connecticut.*

I have the honor to submit herewith my report for the year ending November 30, 1894.

Very respectfully, your obedient servant,

E. BURROWS BROWN,
Inspector of Factories.

REPORT

OF

THE INSPECTOR OF FACTORIES.

OFFICE OF INSPECTOR OF FACTORIES,
HARTFORD, CONN., December 1, 1894.

To his Excellency LUZON B. MORRIS, *Governor:*

The Act creating the office of Inspector of Factories makes it the duty of the inspector to carefully examine as often as practicable all buildings and places where machinery is used, and to report to your Excellency on or before the first day of December in each year, the condition, as respects safety to life and health, of the factories, buildings and places visited by him, which report is to be printed for the use of the General Assembly at each of its regular sessions. In performance of the duty so imposed, I beg to report that during the year ending November 30, 1894, there have been officially visited and carefully examined by the Inspector, or by special agents employed to assist him in the performance of the duties of his office, 1,154 factories and places where machinery is used, this number is 678 in excess of the number examined the preceding year and 665 greater than have been visited in any one previous year since the organization of this office. In 379 of the establishments visited, the conditions as respects safety to life and health of those employed therein were found to be so satisfactory that no changes were considered necessary. In the remaining 775, in order to protect, so far as practicable, the lives and health of those employed therein while engaged in their ordinary duties, it was considered necessary by the Inspector to issue to the owners, or those in control of said places, notices to make certain changes in their establishments. The changes so ordered number 1,789. Of this number 1,450 were intended to insure greater security against accidents, and 339 were considered

requisite for the preservation of the health of those employed. The aggregate of persons employed in the places examined during the year is 93,428. In those places where no changes were ordered 17,174 persons were employed, while in the 775 places in which changes were ordered to be made, there were 76,254 persons employed. With but very few exceptions those who had charge of making these changes have shown a most satisfactory inclination to complete the same within the time granted by the law, and I am gratified to report that in but few instances has it been necessary to make additional visits to secure completion of the changes ordered.

Of the Eastern States, Connecticut, although small in area and population as compared with others, has by her great and varied manufacturing interests acquired a degree of prominence and prosperity of which her citizens can well be proud. Grouped together in our great manufacturing cities, or scattered throughout the length and breadth of our State, her great factories and workshops send to all parts of this county and the world such samples of the skill of their workmen as enables them to compete successfully with all others. Although standing twenty-ninth among the States in the number of inhabitants, Connecticut ranks as the tenth in value of manufactured products, and only a few States exceed her in the relative proportion of value of manufactures to population. Our population in 1890 was 746,258, and of this number 149,939 persons, or 20 per cent., were employed in factories and workshops.

The following from the census returns for Connecticut for the year ending May 31, 1890, affords some interesting facts illustrating the great importance of the manufacturing industries in this State:

Number of establishments reported,	6,822
Value of plants,	$ 101,457,999
Live assets,	125,546,497
Total capital,	227,004,496
Average number of employees,	149,939
Total wages year ending May 31, 1890,	75,990,606
Officers, firm members and clerks, (male),	8,632
Wages,	9,167,490
Officers, firm members and clerks, (female),	793
Wages,	357,799
Operatives, skilled and unskilled, (males over 16),	83,895
Wages,	45,553,505
Operatives, skilled and unskilled, (females over 15),	23,095
Wages,	6,753,854
Operatives, skilled and unskilled (children),	2,759
Wages,	477,627

Piece workers, (males above 16), - -	17,423
Wages, - - - - -	$ 9,669,768
Piece workers, (females above 15), - -	13,016
Wages, - - - - -	3,944,039
Piece workers, (children), - - -	326
Wages, - - - - -	66,524
Cost of materials used in manufacturing, - -	123,183,080
Value of products, - - - - -	248,336,364

That the great and fast-increasing proportion of her citizens engaged in manufacturing should so far as possible be guarded against accidents and be surrounded by such conditions as would be conducive to the preservation of their lives and health, the State has placed upon her statute books our Factory Inspection laws, and from time to time amended or added to these laws as experience has proven necessary. While these laws were enacted primarily for the benefit and protection of the employed, yet the interest of the employer is so closely identified with that of his employee, that anything tending to improve the condition of one cannot but be of mutual benefit to the other.

FIRE ESCAPES.

The inefficiency of our laws regarding fire escapes demands the attention of the General Assembly. Many of our factory buildings are of wood and highly inflammable. Others, of brick or stone, are filled with inflammable materials, and the lives of the working people, especially in the upper floors, are in daily peril because of insufficient exits or any suitable arrangement of fire escapes. In all these cases the danger of loss of life by fire is supplemented by an almost equal danger of death or injuries in the event of a panic among the employees, and a mad rush for the open air.

It is to be regretted that, as explained at some length in my report for 1893, the Factory Inspection laws do not give the Inspector power to order changes in factory buildings by which these dangers may be averted.

The laws found in the General Statutes, Secs. 2,645, 2,646 and 2,647, relating to the subject of fire escapes, were variously amended in 1889 and 1893, and now read as follows:

"SEC. 2,645. Every story above the second story, not including the basement, in any workshop, manufactory, hotel, building occupied on such story as an assembly or lodge room, by any literary, benevolent, or other society, boarding house accommodating more than twelve lodgers, or tenement house arranged for or occupied by more than two families, shall be provided with more than one way

of egress, by stairways on the inside or fire escapes on the outside of the building, and such stairways and fire escapes shall be kept free from obstruction and shall be accessible from each room in said story.

"SEC. 2,646. It shall be the duty of the first selectman of the town, or the fire marshal of the city, or the mayor of the city, when there is no fire marshal, or the warden of the borough, in which any such building is situated, to examine all buildings referred to in the preceding section, and if, on examination, he finds that such building is provided with fire escapes or stairways, as required by said section, he shall furnish the owner thereof with a certificate to that effect, in which case such owner shall not be liable.

"SEC. 2,647. Every owner of such building who shall violate any of the provisions of the two preceding sections, shall be fined fifty dollars."

It will be seen that the power to enforce protection by fire escapes or otherwise for the employees in our factories, is placed by the law, not in the hands of the Inspector of Factories, who, from experience with the subject would be best qualified to determine what changes in the way of better protection are needed, but in the hands of the local authorities. In the course of my examinations of factories throughout the State, I have found that there are comparatively few places where the local authorities have complied with the law. They do not appear to regard the examinations as incumbent upon them, and there is no exaggeration in saying that the law is practically obsolete throughout Connecticut to-day.

In two of the larger manufacturing States, Massachusetts and New York, the matter of fire protection for factory employees is very properly placed in the hands of inspectors in State employ. In Massachusetts, the law reads as follows:

AN ACT IN RELATION TO WAYS OF EGRESS AND MEANS OF ESCAPE FROM FIRE IN CERTAIN BUILDINGS.

"SEC. 1. Every building now or hereafter used in whole or in part, as a public building, public or private institution, schoolhouse, church, theatre, public hall, place of assemblage or place of public resort, and every building in which ten or more persons are employed above the second story in a factory, workshop, or mercantile or other establishment, and every hotel, family hotel, apartment-house, boarding-house, lodging-house, or tenement-house in which ten or more persons lodge or reside above the second story, and every factory, workshop, mercantile or other establishment, the owner, lessee, or occupant of which is notified in writing by the inspector hereinafter mentioned, that the provisions of this act are deemed by him applicable thereto, shall be provided with proper ways of egress, or

other means of escape from fire, sufficient for the use of all persons accommodated, assembling, employed, lodging, or residing in such building; and such ways of egress and means of escape shall be kept free from obstruction, in good repair, and ready for use. Every room above the second story in any such building in which ten or more persons are employed shall be provided, if the inspector mentioned in the following section shall so direct in writing, with more than one way of egress by stairways on the inside or outside of the building, placed as near as practicable at opposite ends of such room; stairways on the outside of the building shall have suitable railed landings at each story above the first, and shall connect with each story by doors or windows; and such landings, doors, and windows shall be kept clear of ice and snow and other obstructions. Women or children shall not be employed in a factory, workshop, mercantile or other establishment, in a room above the second story from which there is only one way of egress, if the inspector mentioned in the following section shall so direct in writing. All doors and windows in any building subject to the provisions of this section shall open outwardly if the inspector mentioned in the following section shall so direct in writing."

The law of New York on the subject is equally efficient, and reads as follows:

"If, in the opinion of the factory inspector, it is necessary to insure the safety of the persons employed in any manufacturing establishment, three or more stories in height, one or more fire escapes, as may be deemed by the factory inspector as necessary and sufficient therefor, shall be provided on the outside of such establishment, connecting with each floor above the first, well fastened and secured and of sufficient strength, each of which fire escapes shall have landings or balconies not less than six feet in length and three feet in width, guarded by iron railings not less than three feet in height, and embracing at least two windows at each story and connecting with the interior by easily accessible and unobstructed openings, and the balconies or landings shall be connected by iron stairs, not less than twenty-four inches wide, the steps not to be less than six inches tread, placed at not more than an angle of forty-five degrees slant, and protected by a well-secured hand-rail on both sides with a twelve-inch wide drop-ladder from the lower platform reaching to the ground. Any fire escape so constructed shall be sufficient Any other plan or style of fire escape shall be sufficient, if approved by the factory inspector, but if not so approved, the factory inspector may notify the owner, proprietor, or lessee of such establishment or of the building in which such establishment is conducted, or the agent or superintendent, or either of them, in writing, that any such other plan or style of fire escape is not sufficient, and may, by an order in writing, served in like manner, require one or more fire escapes, as he shall deem necessary and sufficient, to be provided for such establishment, at such locations and of such plan and style as

shall be specified in such written order. Within twenty days after the service of such order, the number of fire escapes required in such order for such establishment shall be provided therefor, each of which shall be either of the plan and style and in accordance with the specifications in said order required, or of the plan and style in the section above described, and declared to be sufficient. The windows or doors to each fire escape shall be located as far as possible consistent with accessibility, from the stairways and elevator hatchways or openings, and the ladder thereof shall extend to the roof. Stationary stairs or ladders shall be provided on the inside of each such establishment from the upper story to the roof, as a means of escape in case of fire."

Should the General Assembly conclude that it is desirable to continue in the hands of local authorities this entire matter of fire protection, then I earnestly renew the recommendation made in my report for 1893 in Sec. 2,645, "that the stairways to be provided therein shall be placed as near as practicable at opposite ends of the room, and guarded as provided in the Massachusetts law, and that whenever fire escapes are required they be of such material, construction, and capacity as to afford a safe and speedy means of escape in case of fire, and that section 2,647 be so amended as to provide for a more efficient enforcement of the law by the local authorities."

UNSAFE BUILDINGS.

Among the dangers to which factory employees are exposed, there is none greater than that arising from buildings, weakened from the age of materials and overloaded beyond the safety point with machinery and goods. The inspection work of the past year has revealed some instances of this kind, and letters have been received at this office during the past two years, inviting attention to others. The law relating to unsafe buildings is found in Sec. 2,626 and 2,627 of the Revised Statutes, which r ad as follows:

"Sec. 2,626. The court of common council of each city shall have power to make ordinances to prevent the erection of unsafe buildings therein, to provide for the examination of all plans and specifications of proposed buildings, to provide for the inspection of all buildings in process of erection, to make general rules regarding the materials to be used in buildings, and the strength and manner of using the same, to prohibit the erection of any building not in conformity with such rules and the plans and specifications of which shall not have been examined and approved in accordance with such ordinance, and to provide for the appointment of an inspector of buildings.

"Sec. 2,627. The selectmen of any town, the court of common

council of any city, and the warden and burgesses of any borough, may, and on the written application of any of its inhabitants, shall examine any building or proposed building therein with reference to its safety, after reasonable notice to the owner or builder and occupant, and may make such written order relative to its construction, maintenance, protection, repairs, or removal, as they may deem proper, a true and attested copy of which shall be left by some proper officer with or at the usual place of abode of such occupant, and such owner or builder, if resident in this State."

It is possibly an oversight on the part of the framers of the Factory Inspection law that, while the local authorities have power to make orders relative to unsafe buildings, the Inspector of Factories is given no authority whatever in the matter. As a non-resident, he cannot even prefer a request to the local authorities to act, or even to make an examination of a factory building which is clearly unsafe. It would seem to be advisable that the law be amended so as to give him authority to request that an examination be made and orders given, if any may be found necessary, for the placing of the building in a safe condition.

SANITARY CONDITIONS.

In this respect, the Connecticut laws are insufficient. Sec. 2,267 of the General Statutes requires that every person or corporation owning or operating any factory, workshop in which five or more persons are employed, must provide "suitable water closet accommodations." The fault with our law is that it is not explicit, and even in instances where closets for men and women are not separated, where doors do not close, and even where the contents are not frequently removed or properly carried off by a water flow, the claim is made that the accommodations are sufficient and quite within the requirements of the law. As a result, the sanitary conditions in some of our factories are extremely bad, and the employers object to the expense and trouble of remedying them. Questions not only of decency, but of the health of employees are involved in this matter, and it would appear advisable that the powers of the Inspector be so enlarged that he may be in a position to enforce such changes as will produce reasonable sanitary conditions in cases, comparatively few as they are, where strong measures are necessary.

VENTILATION.

Many employees engaged in buffing, polishing and grinding in the factories manufacturing metal goods have been substantially benefitted by the law enacted in 1893 empowering the Inspector of Factories to

order the introduction and operation of suitable apparatus for removing the excessive dust generated in these pursuits. This dust, drawn into the lungs of the workmen, is very injurious and is frequently the origin of diseases which, in a shorter or longer time, are fatal. In many factories the proprietors had, prior to the law of 1893, adopted measures for the removal of this dust, and since its passage, similar or later improved methods have been adopted in several other factories in the State. Efficient as the Connecticut law may be for the protection of metal workers, it might properly be extended to employees in other pursuits. The Massachusetts law is more thorough than that of any other State in this respect, for it applies not only to dust from metals, but requires provision for ventilation so "as to render harmless, as far as practicable, all gases, vapors, dust or other impurities generated in the course of any manufacturing process or handicraft carried on, * * * that may be injurious to health."

With comparatively few exceptions, the manufacturers of Connecticut have pursued a liberal and intelligent course in the matter of the general ventilation of factory buildings, and in several instances they have expended large sums in providing systems of artificial ventilation. In other cases we find the other extreme, confined air, with vapors and gases arising from manufacturing processes, insufficient window space and the temperature oppressive. It must be evident that these conditions are not conducive to the best work by the employees, and that it is not, independent of the wrong inflicted upon the working people, a wise business policy to permit such conditions to exist. There may be, as some manufacturers assert, certain manufacturing processes which cannot be conducted to advantage in freely ventilated rooms, but in most instances such a system of ventilation could be secured as would greatly benefit the employees without detriment to the employer.

SEATS FOR FEMALE OPERATIVES.

Another enactment by the General Assembly of 1893 which has been beneficial to the working people is the law requiring that in all mercantile, mechanical or manufacturing establishments suitable seats for the use of female employees shall be provided, and that the use of the seats by such females shall be permitted "when they are not necessarily engaged in the active duties in which they are employed."

Public sentiment on this subject had, prior to the passage of the law, done much toward leading employers, especially in stores, to

care for the physical welfare of the women and girls in this respect, and the crystallizing of this sentiment into the form of law has had a further beneficial effect. Its observance is now general throughout the State, and few complaints of violations have been received.

ELEVATORS.

In view of the rapidly increasing use of elevators in factories, stores, hotels and office buildings, the legislation by the General Assembly of 1893 regarding the custody of elevators and that requiring that safety devices be provided for all elevator cabs or cars alike for those conveying passengers and freight, if considered necessary by the Inspector of Factories, was timely and has proved beneficial.

Elevators of modern construction are, almost without exception, fitted with effective devices for holding the car in the event of the parting of the cable. But many of the older ones, especially those of cheap construction and used for freight purposes in factories, were unprovided with safety devices of any kind, and accidents were frequent and often fatal. The Inspector has given careful attention to the enforcement of the new law as to safety appliances, as well as to guards for elevator wells, and accidents are now comparatively rare.

The prohibition of the employment of boys under sixteen in the care and running of elevators has been generally observed. The inexperience and carelessness of boys scarcely in their teens, have been, in years past, largely responsible for many of the elevator accidents reported. The prohibition of the employment of such persons is wise and should be maintained.

REPORTS OF ACCIDENTS.

I beg leave to renew the recommendation made in my last report for a law requiring that whenever a serious accident occurs to employees of mercantile and manufacturing establishments, mines or quarries, that the employer of the person injured or killed be required to report the facts to the Inspector of Factories. Such reports would favor early investigations by this office, and orders designed to prevent further accidents in cases where they were due to conditions which might be changed. Sec. 3,567 of the General Statutes requires early reports of accidents on railroads, to the end that investigations may be made by the Railroad Commissioners, if deemed necessary. This requirement is of advantage not only to the public but to the railroad corporations, in that an official finding of the

facts may be made, and a like requirement applying to manufacturing and other establishments, might be of equal advantage.

WORK OF THE OFFICE.

Following is a summary of the work of this office during the last five years and five months:

	Number of Factories Inspected.	Number in Good Condition.	Number in which Changes were Ordered.	Number of Orders Given.	Number of Operatives in Places Inspected.
1889—5 months.	255	128	127	206	42,089
1890—1 year....	489	197	292	710	63,141
1891—1 year....	435	193	242	579	55,922
1892—1 year....	414	221	193	482	51,996
1893—1 year....	476	220	256	566	68,098
1894—1 year....	1,154	379	775	1,789	93,428

An inspection of the table above printed shows that the work of the office has increased annually, and that during the year 1894, it was more than double that of any year since the office was established.

REVISION OF FACTORY INSPECTION LAWS.

Seven years have elapsed since Connecticut, in 1887, with due consideration for the safety and health of that constantly increasing class of her citizens employed in the manufacturing establishments of the State, enacted our Factory Inspection laws, providing for a system of State supervision over "all buildings and places where machinery shall be used." These laws were substantially a copy of those then in force in Massachusetts, and although since that time that State has been constantly amending and adding to her laws relating to factory inspection, the Connecticut laws have remained, with the exception of slight amendments and additions, the same as when originally enacted.

It would seem advisable that at the next session of our General Assembly our laws relating to factory inspection should be carefully examined and compared with the laws of other States on the same subject, to determine if any further legislation is demanded to fully protect the rights of all who are engaged in the chief industry of our State.

I would also suggest that the new General Assembly should cause to be codified, consolidated and arranged all laws now in force, or which may be enacted by such General Assembly, relating to factory inspection, or which it is the duty of the Inspector of Factories to enforce, together with the laws which are particularly applicable to both the owners and operatives in our manufacturing and mercantile establishments. Such an arrangement of our laws would best meet the intelligent requirements of all whom they may concern.

CONCLUSION.

In presenting to your Excellency this, my second Annual Report, I desire through you to thank the manufacturers of the State for the very general disposition they have shown to conform to our factory inspection laws and carry out such orders and suggestions as I have had occasion to make in the discharge of my duty.

Whenever any question has arisen as to the necessity or practicability of any change ordered, it has been my intention, while taking especial care to guard to the fullest extent the life and health of the employed, not to impose on the employer any unnecessary cost, or to cause needless embarassment to his business. In this way it has been in most cases possible to come to an understanding satisfactory to all concerned. I am glad to say that the supervision which the State exercises in her system of factory inspection is gradually gaining favor with employers, who are becoming aware that the better care and attention given their establishments the less liability there is to accident and consequent claim for damages, and that an Inspector who is constantly visiting factories can often assist them in pointing out dangerous places in their establishments which they have overlooked. There is no question that the owners and managers of our great manufacturing establishments are becoming more fully aware that the more directly and actively they interest themselves in the welfare of those employed by them, the more cheerful and better will be the service rendered, and in several manufacturing establishments large sums have been expended in securing the safety and comfort of the working people. Such places are object lessons to others less liberal or advanced in their ideas, showing in the improved condition generally of those employed in such establishments and the increased interest they manifest in their work, that they fully appreciate the care shown by their employers for their comfort and welfare.

Respectfully,

E. BURROWS BROWN,

Inspector of Factories.

REPORT OF INSPECTIONS.

Inspections and Orders from December 1, 1893, to December 1, 1894.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1	Cotton goods,	168	Guard by boxing driving pulleys to drawing frames, carding room.	
2	Steel knives and forks,	94	Provide better ventilation for polishing and finishing rooms: guard by boxing pulley over stairway in main building.	Complied.
3	Buttons,	30	Guard by gates or rails to elevator opening in basement.	
4	Metal refiners,	10	No orders.	
5	Carriage hardware,	60	Guard by boxing or suitable railing driving pulley and belt to large shears in forging room.	Complied.
6	Rubber,	72	Replace guards to rubber rolling machines so as to securely guard all cog-wheels and gears.	Complied.
7	Hooks and eyes, and pins,	125	No orders.	
8	Paper,	100	Guard by railing driving-pulleys to beaters: guard by railing opening in floor of wheel-house; guard in some secure way by boxing or railing screen-belts in screen-room.	Complied.
9	Gas fixtures and lamps,	827	No orders.	
10	Cut glass,	42	No orders.	
11	Britannia and silverware,	212	Guard by rails or gates all elevator openings in main factory.	Complied.
12	Woolen goods,	200	Provide better water-closet accommodations and keep the same in good sanitary condition; provide some system for the better ventilation of second floor; secure wheel in elevator shaft so as to prevent wearing of cable; guard by railing driving-pulleys to fulling mills: provide new flooring for back tower, top floor.	Complied.
13	Wood work,	15	Guard by boxing driving-belt running through floor, second story.	Complied.
14	Wood work,	16	Guard by boxing pulley and belt to moulding machines.	Complied.
15	Machinery,	8	Guard by rails fly-wheel to Rowland engine.	Complied.
16	Paper boxes,	50	No orders.	
17	Machine tools,	10	No orders.	
18	Organs,	160	Guard by boxing pulley and belts to planing machine in basement; provide rails for elevator openings in basement.	Complied.
19	Organs,	215	No orders.	
20	Nickel and silver ware,	98	No orders.	

21	Guns,	185	Guard by railing fly-wheels to engine; clean and disinfect water-closets and keep the same in good sanitary condition.	Complied.
22	Silver plate ware,	400	No orders.	
23	Pocket cutlery and pens,	299	Guard by boxing all belts running through floors in every department; guard or sink flush all projecting set-screws; provide some system for the better ventilation of handle finishing room.	Complied.
24	Steel shears,	10	No orders.	
25	Wood work,	5	No orders.	
26	Britannia and silverware,	1,100	Guard by boxing elevator opening in new brick building near Miller St. entrance; guard by railing driving-wheel to hydraulic pump 4th section 1st floor; cover or sink flush all projecting set-screws; guard all elevator openings by gates or rails; provide and operate within three months from date, such appliances or devices as shall be sufficient to remove from the atmosphere all excessive dust generated in steel buffing room.	Complied.
27	Gas fixtures,	30	No orders.	
28	Publishers,	32	Guard by railing fly-wheel to engine.	Complied.
29	Spring mattresses,	15	Guard by boxing belts running through floor 3d story; extend railing to guard stairway 3d floor.	Complied.
30	Lathe chucks,	75	No orders.	
31	Electrotyping,	18	Guard by boxing pulley and belt to planing machine; guard by boxing belt running through floor 3d story; clean and disinfect water-closet and keep same in good sanitary condition.	Complied.
32	Hardware,	10	Guard by boxing belt running through floor; clean and disinfect water-closet and keep same in good sanitary condition.	Complied.
33	Heaters,	30	Provide better water-closet accommodation and keep same in good sanitary condition.	Complied.
34	Gas stoves,	5	No orders.	
35	Printing,	13	No orders.	
36	Hardware,	76	Guard main driving belt by boxing not less than 4 feet high; guard by boxing pulley and belt to gateing bench; thoroughly clean and disinfect water-closets.	Complied.
37	Fire arms,	1,450	Put up hangers for belts in forging rooms, to prevent the same from hanging on shafting; provide new cable for small elevator in back of office; repair blower in polishing room; guard or sink flush all projecting set-screws.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
38	Hardware,	81	Securely guard fly-wheel to engine.	Complied.
39	Wood work,	100	Guard by boxing belts running through floor in 1st and 2nd story.	Complied.
40	Coach lamps,	31	Provide better water-closet accommodation and keep the same in good sanitary condition.	Complied.
41	Architectural iron,	50	Provide better water-closet accommodation and keep the same in good sanitary condition.	Complied.
42	Knitted underwear,	150	No orders.	
43	Clocks,	550	Provide gates or rails for all elevator openings in main brick factory; provide some system for the better ventilation of old Japaning room in old wood building.	Complied.
44	Shoes,	135	Guard by boxing not less than 4 feet high driving belt in 3d story; guard by iron railing, fly-wheel to Norwalk engine; provide new cable for elevator; provide more than one way of egress from 3d story by additional stairway on the inside or fire escape on the outside of building.	Complied.
45	Electrical supplies,	60	Guard by iron railing fly-wheel to engine.	Complied.
46	Straw hats,	250	Guard driving belts from under shafting in carpenter shop by boxing or railing.	Complied.
47	Corset and shoe trimmings,	65	No orders.	
48	Clock trimmings,	40	Guard by boxing all driving belts running through floors.	Complied.
49	Suspender webbing,	250	No orders.	
50	Machinery,	5	No orders.	
51	Brass goods,	12	No orders.	
52	Press paper and leather goods,	14	Guard set-screw on main shaft in finishing room; guard driving pulley and gears to Callender machine; repair floor in pulp engine room.	Complied.
53	Paper,	40	No orders.	
54	Silk thread,	42	Provide doors for water-closets.	Complied.

55	Silk thread,	50	Provide doors to men's water-closets; guard crank and rod of main engine by secure iron railing.	Complied.
56	Electricity,	5	Guard fly-wheel of engine by sufficient iron railing and place casing at least 12 inches in height around wheel pit.	Complied.
57	Thread,	270	Repair men's water-closet floor in card room; keep water-closet in finishing room in better sanitary condition.	Complied.
58	Thread,	615	True emory wheel and provide safety plates or hood for same; set flush or cover six set-screws in collars on shafts, in bleach room.	Complied.
59	Thread and yarn,	72	Sink flush or cover all projecting set-screws on lapwinder machine in card room, 2nd floor; guard by sufficient hand rail, pit to main driving pulley near line shaft, 1st floor.	Complied.
60	Thread,	391	No orders.	
61	Wood work,	30	Guard driving pulley and belt to turning machine, 2nd floor; guard by iron railing crank and fly-wheel of engine; provide and keep closed when not in actual use trap door to pit opening, 1st floor; keep premises in safer condition by removing inflammable material oftener.	Complied.
62	Blinds, sashes and doors,	20	Guard by rails or boxing main pulley and driving-belt or extend guard casing to same; guard by boxing pulley and belt to morticing machine, 3d floor; box driving pulley and belt shaper machine, 3d floor; guard opening in 3d floor by railing or provide trap doors for same and keep closed when not in use; provide suitable water-closet accommodations for persons employed; true up shaft on 3d floor, and secure box and hanger at end of said shaft; box or guard by railing main pulley to sawing machine, 1st floor; clear up shavings and all inflammable material on 1st, 2nd and 3d floors, and keep clean as the nature of the business will permit.	Complied.
63	Plumbers' Special Fittings,	17	No orders.	
64	Paper boxes,	27	Keep rooms as clean as the nature of the business will permit; clean and disinfect women's water closet.	Complied.
65	Machinery,	100	Box flanges on and guard shaft driving grind stone, 1st floor; sink flush, or cover all projecting set-screws; clean water-closets and provide suitable seats for same.	Complied.
66	Wood type,	17	Guard main pulley and belts to sawing machine, 2nd floor, by secure railing; sink flush or cover all projecting set-screws.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
67	Cotton buffs,	13	Sink flush, or cover all projecting set-screws in collars on counter shaft, 1st floor.	Complied.
68	Foundry,	73	Sink flush or cover set-screws in collars on main shaft in polishing room; provide substantial guard to blower belt in machine shop; clean and disinfect water-closet.	Complied.
69	Steel and iron tools,	51	Sink flush, or cover set-screws in collars on main shaft	Complied.
70	Targets and traps,	20	Sink flush or cover all set-screws in collars on main shaft, in machine shop; guard by substantial railing opening in floor near pitch kettles; guard elevator openings, ground floor, by gates or bars, and keep same closed when elevator is away from said floor.	Complied.
71	Cotton gins,	125	Box main belt, machine room, 2nd floor; box driving pulleys and belts to planing machine, 2nd floor; sink flush or cover, projecting set-screws in collars on main shaft, in machine shop; guard by substantial bar driving pulley, pit blower room; clean and disinfect water-closets and urinals.	Complied.
72	Steam engines and boilers,	75	Sink flush, or cover all projecting set-screws in collars on counter shaft, machine shop; true up emory wheel in machine shop.	
73	Bed comfortables,	150	Provide either gates, bars, or chains, to protect all elevator openings on ground floor, and keep same closed when elevator is away from said floor.	Complied.
74	Laundry work,	5	Guard fly-wheel and crank of engine by substantial railing; sink flush or cover all projecting set-screws in collars on counter shaft, in mangling room.	Complied.
75	Vices and jack screws,	30	No orders.	
76	Steam boilers,	26	Guard gears and driving pulley to bending roll machine by substantial railing; guard fly-wheel and crank of small engine in south building by railing.	Complied.

77	Sash and blinds,	13	Box driving pulley and belt to tenoning machine, 2nd floor; sink flush or cover projecting set-screws in collars on main shaft, 2nd floor, and on main shaft between buildings; guard driving pulley and belt to sawing machine, 2nd floor, by boxing same.	Complied.
78	Cotton warp suitings,	75	Guard fly-wheel of engine by placing secure railing at south end of steps over said shaft; provide shipper to driving belt of rotary press; sink flush or cover projecting set-screws in collars on all shafting; guard coupling on main shaft in weave rooms, securely; guard main belt from engine, at north end of card room, by boxing. or other secure manner; guard opening in south end jack, landing floor, by railing, and guard north end of said landing by rails or boarding.	Complied.
79	Rolling stock repairs,	35	Guard by covering, all couplings on counter shaft, south shop, and sink flush or cover all projecting set-screws in collars on same shaft, and on main shaft in machine shop; guard by substantial and secure railing fly-wheel, and crank of machine shop engine.	Complied.
80	Machine twist satin, etc.,	200	Securely guard fly-wheel, crank and rod of main engine; securely guard dynamo and belt connected with same; sink flush or cover all projecting set-screws in collars on pump shaft in boiler room; provide new cable for elevator in packing room; replace gate at elevator opening, 2nd floor, and provide gate or chains at elevator openings on basement floor; gates or chains to all elevator openings to be closed when elevator is away from same.	
81	Boilers,	40	Securely guard by railing fly-wheel of engine.	Complied.
82	Carriages,	80	Guard all elevator openings by chains or rails and keep same closed when elevator is away from them; securely guard fly-wheel of engine; guard driving belt to counter shaft in basement, as suggested by special agent.	Complied.
83	Light hardware,	127	Guard all elevator openings by rails or gates; cover or sink flush all projecting set-screws.	Complied.
84	Carriages,	86	No orders.	
85	Carriages,	90	No orders.	
86	Saddlery hardware,	200	Securely guard by boxing low shafting in grinding room; provide rails or gates at all elevator openings.	Complied.
87	Patent medicine,	21	No orders.	
88	Carriages,	70	No orders.	
89	Carriages,	50	Cover or sink flush all projecting set-screws.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
90	Rubber goods,	1,000	Provide new cable for tower elevator; guard by boxing all under shafting and gears in callender room; provide new cable for shipping room elevator; guard all elevator openings by gates or rails; guard by boxing belt running through floor in box making room; cover or sink flush all projecting set-screws.	
91	Woolen underwear,	175	No orders.	
92	Rubber boots and shoes,	1,300	Box belt through floor in grinding room; put gates or rails at all elevator openings; box belt running through floor, in box making room; guard all under shafting and gears on washers in mill room; cover or sink flush all projecting set-screws.	Complied.
93	Light metal goods,	25	No orders.	
94	Ivory buttons and light brass ware,	62	No orders.	
95	Malleable iron,	500	No orders.	
96	Mill machinery,	600	Box belt running through floor in upper machine room; guard by iron railing fly-wheel of Atlas engine in carpenter shop; reset all keys to sleeve couplings where same project above the surface.	Complied.
97	Brass and copper,	810	Guard pulleys to pin machines by wood guard, as suggested by special agent, or other safe manner; provide some system for removing the excessive steam generated in plating room; cover or sink flush all projecting set-screws; have rouge buffing room thoroughly cleaned, and keep the same as clean as the nature of business will permit.	Complied.
98	Electrical supplies,	80	Guard by boxing driving pulley and belt to braider, 3d floor; cover or sink flush all projecting set-screws.	Complied.
99	Light brass and bronze goods,	18	Box belt running through floor to saw frame, 2nd story; cover or sink flush all projecting set-screws.	Complied.
100	Woolens and cottons,	130	Cover or sink flush all projecting set-screws; clean and disinfect water-closets, and keep the same in good sanitary condition.	Complied.
101	Corsets,	200	No orders.	

102	Cotton underwear,	90	Replace gate to elevator opening; cover or sink flush all projecting set-screws on, under, and over shafting.	Complied.
103	Shoes,	35	Cover or sink flush all projecting set-screws; keep water-closet in buttoning room in good sanitary condition.	Complied.
104	Printing,	55	Securely guard driving belt in composing room by boxing not less than 6 feet high; cover or sink flush all projecting set-screws.	Complied.
105	Buttons,	30	Put up hangers for press belts; cover or sink flush all projecting set-screws.	Complied.
106	Cotton and worsted cloth,	60	Remove broken pulley on counter driving shearing machine in finishing room; securely guard main pulley, south end, finishing room; securely guard main belt overhead passageway, engine room, or procure new belt for same; guard hoistway 2nd and 3d floors, bars across doors to same and keep closed when not in actual use; sink flush or cover all projecting set-screws on shafting; securely guard gears on turster machine, spinning room, and replace boxing to driving pulleys on looms; securely guard pulleys to blower, dry room; provide suitable water-closet accommodation for males employed: keep all rooms as clean as the nature of the business will permit, first thoroughly cleaning same.	Complied.
107	Silk spools and printing,	40	Sink flush or cover projecting set-screw in collar on counter shaft, wood working room; put safety catches on elevator in good working order; protect by gates, bars, or chains, elevator openings on lower floor and keep same closed when elevator is away from said floor; provide new cable for elevator; true up large emory wheel in machine shop.	Complied.
108	Machinery,	8	Guard by boxing main shaft near stairway.	Complied.
109	Bent carriage work,	8	Box driving belt through floor, 2nd story; guard opening in floor, 2nd story.	
110	Drop presses,	30	Put up hangers for belts in forging room.	Complied.
111	Iron wire,	300	Guard by secure iron railing, both fly-wheels to engines; provide new floor for main engine room; securely guard by iron railing, face of fly-wheel to small engine; provide some system to remove excessive steam generated in pickling room; thoroughly clean entire factory; repair floors and keep factory as clean as the nature of the business will permit.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
112	Malt liquors,	30	Guard by railing idler pulleys and belts in kettle room.	Complied.
113	Wood trimmings,	18	Guard by boxing pulleys and belts to large planer, 1st floor; cover or sink flush all projecting set-screws.	
114	Builders' supplies,	7	No orders.	
115	Wood work,	25	Securely guard all pulleys and belts to planing machines, in new mill; box belt running through floor, 2nd story.	Complied.
116	Wood work,	20	No orders.	
117	Wood work,	15	Box belt to main shaft, 1st floor; securely guard all pulleys to planing machines, basement; guard by railing, main shaft in basement; provide better water-closet accommodations.	Complied.
118	Builders' supplies,	10	Box belt to main shaft, 2nd floor.	Complied.
119	Watches,	300	Put up hangers for press belts to prevent the same from running on shafting when not in use; put water-closets in buffing room in better sanitary condition.	Complied.
120	Brass and copper,	400	Guard gears on drawing benches, 2nd story; guard gears to large shears in brass and copper mills; box belt running through floor in machine room; cover or sink flush all projecting set-screws; disinfect water-closets in brass and copper mills, and keep the same in good sanitary condition.	Complied.
121	General machinery,	350	Securely guard gears to power cranes in foundry.	
122	Brass lamps and fixtures,	600	Securely guard fly-wheel to Ball engine; cover or sink flush all projecting set-screws; securely guard gears to drawing presses, 1st floor; thoroughly clean buffing room and keep the same as clean as the nature of the business will permit.	Complied.
123	Machinery,	60	Securely guard fly-wheel to engine; box belt running through floor, 3d story; cover or sink flush all projecting set-screws.	Complied.
124	Paper boxes,	80	Cover or sink flush all projecting set-screws.	Complied.
125	Paper boxes,	70	Cover or sink flush all projecting set-screws.	Complied.
126	Carriages,	40	No orders.	

127	Corsets,	325	Put rails or gates to all elevator openings; remove obstruction to fire-escape, 4th story.	Complied.
128	Vehicles,	251	Cover or sink flush all projecting set-screws; clean and disinfect water-closets in basement and on 3d floor.	Complied.
129	Vehicles,	90	Guard shaft near stairway in basement; cover or sink flush all projecting set-screws; provide better water-closet accommodations.	Complied.
130	Book printers' machinery	80	Box or guard driving-pulleys and belts, to planing machine, machine shop; box main belt from engine, on 2nd floor, old building; true up and balance large emery wheel, in polishing room, 1st floor; securely guard by bars or chains, elevator openings on 1st and 2nd floors, and keep closed when elevator is away from same; cover or sink flush all projecting set-screws in collars on main and counter shafting, in machine shop.	Complied.
131	Wool shirtings,	97	Securely box main belt from main shaft, weave room; securely cover or sink flush all projecting set-screws in collars on main and counter shafting; remove broken pulley from counter shaft, in machine shop; provide new and suitable fire-escape ladders; provide gates to all elevator openings and keep closed when elevator is away from same; put elevator in safe condition; repair and put in good sanitary condition, by repainting and disinfecting, water-closet in weave room used by females, and one in dye shop; all rooms to be kept as clean as the nature of the business will permit.	Complied.
132	Brass and metal goods,	300	Put up hangers for press belts; put rails or gates to all elevator openings and keep closed when elevator is away from same; put automatic door to freight elevator in proper working order; cover or sink flush projecting set-screw on main shaft in spinning room; thoroughly clean buffing room and keep the same as clean as the nature of the business will permit.	Complied.
133	Brass and metal goods,	900	Put rails or gates at all elevator openings not securely guarded, and keep same closed when elevator is away from same; box pulley and belt to upright winders, 4th floor; box main belt to pumping station; box main belt to winders in attic, western extension; put new cable on wire mill elevator; guard gears on large shears in brass mill; box belts through floor, in rod mill; cover or sink flush all projecting set-screws.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
134	Spoons and forks,	137	Put blower in buffing and trimming room in good working order; thoroughly clean finishing room, and keep as clean as the nature of the business will permit; cover or sink flush all projecting set-screws.	Complied.
135	Electrotyping,	60	Provide gates or rails to all elevator openings, and keep closed when elevator is away from same; cover or sink flush all projecting set-screws.	Complied.
136	Printing,	10	No orders.	
137	Steel screws,	5	No orders.	
138	Locks,	40	Provide better water-closet accommodations; thoroughly clean factory and keep as clean as the nature of the business will permit.	Complied.
139	Casket hardware,	35	Provide better water-closet accommodations; cover or sink flush all projecting set-screws; thoroughly clean factory, particularly buffing room, and keep same as clean as the nature of the business will permit.	Complied.
140	Children's caps and ruffings,	42	Cover or sink flush all projecting set-screws.	Complied.
141	Carriages,	12	No orders.	
142	Automatic machinery,	30	Cover or sink flush projecting set-screw on coupling, end of main shaft; clean factory floors and keep same as clean as the nature of the business will permit.	Complied.
143	Plumbers' supplies,	60	No orders.	
144	Power and light station,	11	No orders.	
145	Brass and copper,	872	Provide blower in buffing rooms to remove excessive dust; securely guard drawing bench in bronze tubing department; guard driving pulley to pointing machines in wire mill; provide some system for removing the excessive smoke generated in electric wire painting room; box section of shaft in pit where crossing is made under shipping room engine; cover or sink flush all projecting set-screws; box belt through floor in press room.	

146	Buckles and small wares,	382	Put up hangers for all press and machine belts, to keep same from running on shafting when not in use; cover or sink flush all projecting set-screws.	Complied.
147	Printing,	13	No orders.	
148	Brass goods,	200	Put rails or gates to elevator openings, 1st floor, stamping room; provide some system for removing the excessive steam generated in plating room.	
149	Brass novelty,	75	Guard or sink flush all projecting set-screws; thoroughly clean factory and keep the same as clean as the nature of the business will permit.	Complied.
150	Light hardware and machinery,	90	Cover or sink flush all projecting set-screws; guard belts running through floor in attic.	Complied.
151	Buttons,	400	Guard elevator openings, 1st floor, wood building, 2nd floor, brick building; provide new cable for elevator in brick building; provide better ventilation in plating room.	Complied.
152	Brass and brass goods,	525	Put water-closet in rolling mill in good order; cover or sink flush all projecting set-screws; repair ventilating fan in dip room; guard both crank and rod to wire mill engine; guard gear and pulley to straightening rolls in rolling mill.	Complied.
153	Metal and cloth buttons,	200	Put rails or gates to all elevator openings, in wood building; cover or sink flush all projecting set-screws.	Complied.
154	Buckles,	75	Put up hangers for all press and machine belts, to keep same from running on shafting when not in use.	Complied.
155	Store trimming, etc., artistic metal goods,	225	Provide rails or gates to all elevator openings, and keep closed when elevator is away from same; provide hangers for all press and machine belts, to keep same from running on shafting when not in use; thoroughly clean buffing and polishing rooms.	Complied.
156	Spoons and forks,	250	No orders.	
157	Clocks,	850	Box driving belt through floor, 2nd story, B building; provide some system for removing excessive steam generated in plating room; improve blower system in buffing room; provide rails or gates at all elevator openings in movement factory, and case shop, and keep closed when elevator is away from same.	Complied.
158	Suspender webbing,	200	Cover or sink flush all projecting set-screws.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
159	Brass goods,	550	Provide new cable for elevator in long brick building, No. 9; put up hangers for press belts, to keep same from running on shafting when not in use.	Complied.
160	Sheet metal and brass goods,	1,300	Raise floor at south mill, so as to prevent water standing on same; put gates to packing room elevator in good working order; provide new cable for east building elevator; guard or sink flush all projecting set-screws; guard gears to drawing press, 1st floor, main building.	
161	Silk,	24	Provide some system for better ventilation of factory.	Complied by removal
162	Silver and plated ware,	150	Provide better ventilation in old plating room; securely guard fly-wheel of main engine; thoroughly clean factory, particularly old building; put elevator gates in good working order in old building, and keep closed when elevator is away from same; securely box belt running through floor in polishing room, 2nd floor; clean and disinfect water-closet in burnishing room, 5th story.	Complied.
163	Sterling silver and plated goods,	8	Securely box all belts where running through floor; securely cover or sink flush set-screw in collars on shaft, 1st floor.	Complied.
164	Boots and shoes,	22	Securely cover or sink flush projecting set-screw in collar on upright engine in basement; guard by chains or rails elevator opening in basement, and keep closed when elevator is away from same; disinfect male water-closet on 3d floor.	Complied.
165	Paper and fancy boxes,	29	Securely box belt where running through floor; disinfect male water-closet; repair and put in order female water-closet.	Complied.
166	Lithographic printers,	8	Securely cover or sink flush set-screw in collar on main shaft; repair and put in order male water-closet.	Complied.
167	Leather belting,	162	Securely box all belts where running through floor; securely cover or sink flush projecting set-screws on end of main shaft, 4th floor, on shaft, south side 2nd floor, and on shaft in hide room.	Complied.

168	Pins,	30	Cover or sink flush projecting set-screw in collar on shaft in machine room; provide suitable hand railing to stairs from pin shop to machine room.	Complied.
169	Screw machines and screws,	285	Provide some better system for ventilating west and east machine shops; provide better water-closet accommodations for east machine shop; adopt some system for better ventilation in street shop water-closet, first floor; put in working order the exhaust pipes on west side of polishing room.	Complied.
170	Machinery,	8	No orders.	
171	Machinery,	6	No orders.	
172	Writing machines,	125	Provide some system for ventilating all water-closets in work shops; provide hangers for belts in buffing room and press belts in machine room, new shop, to keep same from running on shafting when not in use; cover or sink flush projecting set-screw in collar on shaft, west end of machine room; box upright belt to tumbler barrel in machine room.	Complied.
173	Special machinery,	51	Box belt running through floor, 2nd story; put up hangers for press belts, 1st floor, to keep same from running on shafting when not in use; cover or sink flush projecting set-screw in collar on main shaft, 1st floor, west end of building; true up shafting, west end of building, 1st floor.	Complied.
174	Electric motors,	5	Put up hangers for press belt, to keep same from running on shafting when not in use.	Complied.
175	Electroplating,	5	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
176	Machinery,	20	Put up hangers for belts to keep same from running on shafting when not in use.	Complied.
177	Eyelets,	12	Put up hangers for belts, to keep same from running on shafting when not in use; thoroughly clean factory and keep same as clean as the nature of the business will permit; provide rail or gate to elevator opening on your floor, and keep closed when elevator is away from same; provide some means to keep oil of vitriol from dripping through floor upon employees and machinery on floor below; provide some system to secure better ventilation in south end of room.	Complied.
178	Electric supplies,	16	Guard elevator opening on your floor with suitable rail or gate, and keep closed when elevator is away from same; provide some better system for ventilating water-closet.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
179	Wagons,	20	Thoroughly clean and put in good order water-closet.	Complied.
180	Cabinet work,	35	Securely guard by railing, driving-pulley and crank of engine.	Complied.
181	Door and sashes,	5	Thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
182	Door, sashes and blinds,	16	Box or securely guard belts to counter shafts of planers where running near floor; cover or sink flush projecting set-screws on pulleys of planers where running near floor, or otherwise guard the same; securely guard driving-pulley in engine room; clean and disinfect water-closet and keep same in good sanitary condition.	Complied.
183	Horse-shoe nails,	143	Provide rails or gates to all elevator openings, and keep closed when elevator is away from same; cover or sink flush all projecting set screws in collars on main and counter shafting; put up hanger for belt in machine room, to keep same from running on shafting when not in use.	Complied.
184	Planing,	50	Securely guard by boxing belts and set-screws, on planers where running near floor.	Complied.
185	Gas,	40	No orders.	
186	Plain and fancy mantels,	18	Box belt where running through floor, west end 2d story; guard crank to engine by railing; cover or sink flush projecting set-screws in collars on main and counter shafting north side of building, 1st floor.	Complied.
187	Underclothes,	250	Cover or sink flush projecting set-screws in collars on main shaft east end of building, 1st floor, also on shafting west end 2d floor.	Complied.
188	Crochet machines,	25	Securely cover or sink flush projecting set-screw in collar on counter shaft; provide better ventilation for polishing room.	Complied.
189	Mantels,	20	No orders.	
190	Mouldings,	12	No orders.	
191	Silk thread and yarns,	Usually 85	Not running.	

192	Special machinery,	45	Provide more than one way of egress by stairway on inside, or fire escape on outside of building; provide better system for ventilating water-closet.	
193	Machine tools and special machinery,	25	Provide more than one way of egress by stairway on inside, or fire escape on the outside of building.	
194	Bicycles,	800	Cover or sink flush all projecting set-screws in collars on main or counter shafting; provide some system for the better ventilation of polishing rooms; provide suitable railing or box around end of tapering machine in drop shop.	Complied.
195	Copper and steel drop forgings and wrenches,	150	Provide rail or gates to all elevator openings in store-house and keep closed when elevator is away from same; securely guard by railing, belt for elevator, in machine room, 1st floor.	Complied.
196	Machinery and tools,	900	Provide railing to all elevator openings in north, south, east and west buildings, and keep closed when elevator is away from same; put in good working order gate to elevator 2d floor main building or machine shop; provide some system for ventilating water-closets in machine shops; provide some system for ventilating machine room in south building 1st floor; cover or sink flush projecting set-screw in collar on shaft, in engine room east building.	Complied.
197	Steel tubing,	76	No orders.	
198	Typewriting machines,	12	No orders.	
199	Wire mattresses,	105	Box belt where running through floor.	Complied.
200	Screw and special machinery,	25	No orders.	
201	Insulators and vulcanized asbestos goods,	50	Repair and put in good working order gate at elevator opening on 3d floor; box belt where running through floor 2d story, street building; relay flooring around hydraulic presses 1st floor, street building.	Complied. Complied.
202	Valves and steam fittings	350	Cover or sink flush projecting set-screw in collar on main shaft 2d floor; provide hangers for belts where running on main shafting when not in use; repair and put in working order railing to elevator opening in foundry.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
203	Pumps, feed and water-heaters,	50	Cover or sink flush projecting set-screw in collar on shafting 2d floor; provide railing, or box belt where running near floor, 2d story in pattern room.	Complied.
204	Chucks,	75	Securely cover or sink flush all projecting set-screws on main shafting 1st and 2d floors.	Complied.
205	Wood screws,	47	No orders.	
206	Special machinery,	15	No orders.	
207	Screw drivers, drills and braces,	11	No orders.	
208	Bicycles,	8	No orders.	
209	Packing boxes,	30	Box belt where running through floor; securely cover or sink flush projecting set-screw in collar on shafting in basement; guard by railing, or box, belt to planer where running near floor, in basement; guard by railing fly-wheel to engine.	Complied.
210	Boilers,	35	Securely cover projecting set-screw in collar on main shaft.	Complied.
211	Coffins,	20	Put rails at all elevator openings and keep down when elevator is away from them; guard by railing, crank and rod of engine.	Complied.
212	Gloves and mittens,	63	No orders.	
213	Light machinery,	71	No orders.	
214	Harness and saddlery,	200	No orders.	
215	Electric light and power,	6	No orders.	
216	Blank books and envelopes,	250	Securely cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by rails or gates elevator openings and keep closed when elevator is away from same.	
217	Special hardware,	100	Guard crank and fly wheel to Harris-Corliss engine; guard or sink flush all projecting set-screws.	Complied.

218	Iron bridges,	305	Guard all exposed gears to punch presses in Cromwell shop; securely guard fly wheel to engine in dynamo room; guard by railing stairway in Template shop; guard all pulleys and belts in dynamo room; cover or sink flush all projecting set-screws.	Complied.
219	Machinery,	30	Guard by boxing belts to saw frame 4th story; cover or sink flush all projecting set-screws.	Complied.
220	Machine work,	8	Guard by boxing driving belt through floor; guard or sink flush projecting set-screw on counter shaft.	Complied.
221	Iron castings,	40	Securely guard all pulleys and under shafting to moulding machines, 1st floor, wood building.	Complied by removal
222	Brass goods,	300	Put up hangers for all press and machine belts to keep same from running on shafting when not in use; provide rails or gates to all elevator openings, and keep closed when elevator is away from same; cover or sink flush all projecting set-screws.	Complied.
223	Pocket cutlery,	44	Repair floor in hafting room: securely guard by boxing, shafting and pulleys in water-wheel room; guard by boxing shafting in hafting room; thoroughly clean factory and keep same as clean as the nature of the business will permit.	Complied.
224	Brass furniture trimmings,	90	Provide rails or gates for all elevator openings to prevent crossing over automatic doors; provide hangers for all press and machine belts to keep same from running on shafting when not in use.	
225	Underwear,	165	Box belts through floor in spinning room; guard by boxing pulley and end of shaft, in seaming room: box pulleys and belts to knitting machines; guard all projecting set-screws.	Complied.
226	Pins and brass goods,	300	Guard by boxing belts through floor in 2d and 3d story; guard elevator openings by railing to prevent crossing over doors; securely guard crank rod and fly wheel, to main engine.	Complied.
227	Lamps and lamp trimming,	250	Securely guard gears to drawing presses; put new cable on elevator; cover or sink flush all projecting set-screws.	Complied.
228	Clocks,	18	Guard or sink flush projecting set serews in collars on counter shaft.	Complied.
229	Clocks,	400	Guard by boxing pulleys and belts to saw frame, case shop; guard by rails or gates elevator opening 1st floor, case shop; securely guard fly wheel to engine, movement shop; cover or sink flush all projecting set screws.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
230	Machinery,	45	No orders.	
231	Paper boxes,	175	Guard all elevator openings by rails or gates; cover or sink flush all projecting set-screws; clean and disinfect water-closets.	Complied.
232	Sheet brass and wire,	250	Guard pulley and belt to straightener in saw room; guard or sink flush all projecting set-screws.	Complied.
233	Watches and clocks,	375	Provide some system for the better ventilation of lacquer room; provide rails or gates to all elevator openings and keep closed when elevator is away from them.	Complied.
234	Locomotives and cars,	1,000	Provide some system for removing excessive dust generated in saw room; provide some system for the better ventilation of machine and blacksmith shops; securely guard gears to shears in boiler room.	
235	Carriages,	300	Provide better water-closet accommodations for painting and blacksmithing departments; guard or sink flush all projecting set-screws.	Complied.
236	Paper boxes,	67	No orders.	
237	Silk twist,	87	Securely guard or sink flush all projecting set-screws.	Complied.
238	Ivory turning,	7	Securely guard pulleys and shaft to saw frame.	Complied.
239	Rattan furniture,	50	Box driving belt through floor, wood-working room; provide gates or rails for elevator openings on 3d and 4th floors; box belt in buffing room, 1st floor.	Complied.
240	Metal goods,	27	Securely guard or sink flush all projecting set-screws.	Complied.
241	Brass locks,	7	No orders.	
242	Fourdrinier wires,	13	No orders.	
243	Grain mills,	5	Guard by railing opening in floor to boiler room; guard or sink flush projecting set-screw in collar on main shaft; thoroughly clean factory and keep the same as clean as the nature of the business will permit.	Complied.
244	Paper boxes,	150	Provide rails or gates for all elevator openings, and keep closed when elevator is away from same; guard or sink flush all projecting set-screws on main and counter shafting.	Complied.

245	Rubber goods,	100	Guard all exposed gears and low shafting to calender and rubber rolling machines in basement.	Complied.
246	Pianos,	160	Guard by boxing all shafting and pulleys near floor, in mill room; clean and disinfect water-closets.	Complied.
247	Buckles,	90	Guard or sink flush all projecting set-screws on main and counter shafting.	Complied.
248	Coffin trimmings,	12	No orders.	
249	Repair shop,	12	No orders.	
250	Marine and stationary steam boilers,	15	Cover or sink flush projecting set-screws in collars on main and counter shafting.	Complied.
251	Coppersmithing,	10	No orders.	
252	Brass castings,	7	No orders.	
253	Steam boilers and engines,	75	Provide chains or rails to elevator openings on 2d and 3d floors, and keep closed when elevator is away from same.	Complied.
254	Lithographing,	16	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
255	Printing and bookbinding,	250	No orders.	
256	Electrotyping,	14	No orders.	
257	Envelopes,	210	Provide rails or chains to all elevator openings and keep closed when elevator is away from same; securely cover or sink flush projecting set-screw in collar on main shaft opposite small elevator.	
258	Brass castings,	6	Securely cover or sink flush projecting set-screw in collar on main shaft in engine room, or bottling establishment.	Complied.
259	Paper and fancy boxes,	30	Cover or sink flush projecting set-screws in collars on main and counter shafting; box belt where running through floor in third story.	Complied.
260	Special machinery and tools,	6	Securely cover or sink flush projecting set-screw in collar on main shaft south end of room.	Complied.
261	Special machinery and tools,	5	No orders.	
262	Iron castings,	22	No orders.	
263	Silk ribbons,	134	No orders.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
264	Grain and feed,	26	Provide new cable for elevator in grist-mill; provide rails or chains to all elevator openings, and keep closed when elevator is away from same; box belt and pulley 3d story in grist-mill; cover or sink flush projecting set-screws in collars on main shaft, first floor in grist mill; box belt where running through floor near stairway in storage building.	Complied.
265	Hardware,		Not running.	
266	Car wheels,		Not running.	
267	Beer,	11	No orders.	
268	Cleaning and dyeing,	40	Provide rail or chain to elevator opening 2d floor, and keep closed when elevator is away from same; provide some system to carry off excessive steam generated in wash room.	Complied.
269	Rubber machinery,	8	No orders.	
270	Patterns,	11	No orders.	
271	Plumbers supplies,	11	No orders.	
272	Castings and machinery,	155	No orders.	
273	Overgaiters and leggings,	50	No orders.	
274	Insulated wire,		Not running.	
275	Railroad car trimmings,	75	Provide some system for taking off dust in polishing room, when in use, for the better ventilation of the same; provide new cable for elevator.	
276	Chainless bicycles,	114	Cover or sink flush projecting set-screw in collar on shaft 4th floor; box belt where running through floor, 3d story; provide rails or gates to all elevator openings, and keep closed when elevator is away from same; provide some system for better ventilation in polishing room.	Complied.
277	Wood ornaments,	8	Provide secure railing to fly-wheel and crank at engine; cover or sink flush projecting set-screw in collar on main shaft south end of building.	Complied.
278	Wood work,	18	Box belts where running through floor.	Complied.
279	Cigar boxes,	17	Cover or sink flush projecting set-screws in collar on shafting.	Complied.

280	Electric light supplies,	25	No orders.	
281	Bookbinding and printing,	18	No orders.	
282	Pocket books,	30	No orders.	
283	Bookbinding and publishing,	20	No orders.	
284	Knit goods,	5	No orders.	
285	Job printing,	12	Securely cover or sink flush set-screw in collar on main shaft.	Complied.
286	Builder,	10	No orders.	
287	Lessee,		Provide suitable hand railing to front stairway; provide rails or chains to all elevator openings, and keep closed when elevator is away from same.	Complied.
288	Worsted and kersey,	100	Guard by secure iron railing crank piston and fly-wheel to main engine; securely cover or sink flush projecting set-screw in collar on main shaft, wet finishing room, No. 2 mill, and on counter shaft in card room; remove broken pulley from steaming machine, in gig room.	Complied.
289	Dress goods,	100	Box gear and driving pulley to Chinchilla machine, in finishing room; box main belt to counter shaft, in finishing room; cover or sink flush projecting set-screw in collar on pump, in weave room; guard fly-wheel to main engine, by secure covering; guard by secure railing gearing and pump in gig room; provide better water-closets, and keep in good sanitary condition; thoroughly clean rooms, and keep same as clean as the nature of the business will permit.	Complied.
290	Shoddies,	15	Thoroughly clean rooms, and keep the same as clean as the nature of the business will permit.	Complied.
291	Fancy cassimeres,	103	Provide shipper to driving belt to picker machine; cover or sink flush all projecting set-screws in collars on main and counter shafting.	
292	Woolen suitings,	85	Provide substantial rail around dynamo machine; guard fly-wheel to engine by iron railing; securely cover or sink flush all projecting set-screws.	Complied.
293	Woolens,	60	Not running.	
294	Woolen overcoatings,	40	No orders.	
295	Shoddy,	50	Box belt to counter shaft in weave room; box or securely cover projecting set-screw and driving pulley to looms; guard by boxing large set-screws in collars on counter shaft in weave room; remove broken pulley to extractor in wet finishing room, and put machine in safe running order; repair all holes and weak places in floor; provide better water-closet accommodations, and keep same in good sanitary condition.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
296	Cassimeres and kersey,	100	Cover or sink flush projecting set-screws in collars on main shaft, weave room, on counter shaft running dryer, and on shaft in card room; provide substantial hand railing around opening to stairway in dry room; repair door to hoistway, and keep same closed when not in actual use.	Complied.
297	Cassimeres and overcoatings,	40	Provide shipper to driving belt for rotary press; cover or sink flush projecting set-screws in collars on main shaft, in finishing room, and counter shaft in weave room.	Complied.
298	Union cassimeres,	50	Guard by iron railing, crank piston and fly-wheel to main engine; box driving pulley and belt to looms; repair casing to main belt, in weave room; clean and disinfect female water-closet in weave room; put substantial bars across 2d and 3d story doors.	Complied.
299	Shoddy and flocks,	30	Replace bar to hoistway, and repair door to same, and keep closed when not in actual use; cover or sink flush projecting set-screws in collars on main shaft in sorting room, and on counter shaft in cutting room; box main belt, 2d story, in new building.	Complied.
300	Shoddy,	10	No orders.	
301	Tin and steel spoons,	10	Provide hangers for press belts; cover or sink flush projecting set-screws in collars on main and counter shafting.	Complied.
302	Printing presses,	20	Provide hand railing to stairway from 2d floor to machine room; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied
303	Electric light,	5	Thoroughly clean floor of engine and dynamo room, and keep same as clean as the nature of the business will permit.	Complied.
304	Fish hooks,	13	Guard by boxing belt through floor of machine room.	Complied.
305	Polishing and plating,	8	Box belt through floor in 3d story.	Complied.
306	Light hardware,	7	Provide new stairway between 2d and 3d floor; thoroughly clean polishing room, and keep same as clean as the nature of the business will permit.	Complied.

307	Wood work,	7	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
308	Cabinet work,	6	Cover or sink flush all projecting set-screws.	Complied.
309	Iron staples,	5	Cover or sink flush all projecting set-screws.	Complied.
310	Rivets and wood work,	20	Guard pulley to moulding machine; guard by boxing pulleys to planers in basement; provide rails or gates to all elevator openings, and keep closed when elevator is away from same; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
311	Hack saws,	27	Provide hangers for belts, to keep same from running on shaft when not in use; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
312	Paper bags,	50	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
313	Bakery,	22	Guard by railing belts through floor, 2d story.	Complied.
314	Wood work,	15	Guard by boxing pulleys to planers running near floor; guard fly-wheel to engine by additional flooring, and iron railing; provide better water-closets, and keep same in good sanitary condition.	Complied.
315	Wood work,	12	Guard by boxing belts through floor, 2d story; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
316	Earthenware,	5	No orders.	
317	Wood work,	7	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
318	Malt liquids,	12	Securely guard by railing, fly-wheel to brewery engine.	
319	Oyster opening,	70	No orders.	
320	Malt liquids,	16	Put gates at elevator openings in proper working order, and keep closed when elevator is away from same.	Complied.
321	Crackers,	34	No orders.	
322	Infants clothing,	21	Guard by boxing shafting running near floor to prevent crossing over same.	Complied.
323	Bookbinding and printing,	90	Securely guard elevator openings; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
324	Confectionery,	20	No orders.	
325	Iron fittings,	255	Guard flange coupling on main shaft, in machine-tapping room; provide some system for better ventilation in pickling room; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
326	Building hardware,	250	Provide better water-closet accommodation, and keep same in good sanitary condition; guard by secure railing, fly-wheel to main engine; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
327	Dyes,	15	Guard elevator opening by bars or chains, and keep closed when elevator is away from same; cover or sink flush projecting set-screws in collar on main shaft, 3d floor.	Complied.
328	Stone tiles,	15	No orders.	
329	Washing powder,	5	No orders.	
330	Electric light,	6	No orders.	
331	Paper specialties,		Not running.	
332	Electric specialties,	35	Guard by rails or chains all elevator openings, and keep closed when elevator is away from same.	Complied.
333	Job printing,	13	Securely cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
334	Paper boxes,	33	No orders.	
335	Job printing,	6	No orders.	
336	Printing,	10	No orders.	
337	Publishing,	5	No orders.	
338	Publishing,	60	No orders.	
339	Printing,	38	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
340	R. R. repairs,	190	Securely cover or sink flush all projecting set-screws in collars on main and counter shafting; repair water-closet, and keep same in good sanitary condition; provide better ventilation for machine shop water-closet.	As modified.
341	Carriages,	19	No orders.	
342	Flour and feed,	17	No orders.	
343	Britannia and silverware,	175	No orders.	
344	Rubber goods,	200	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.

345	Crackers,	15	No orders.	
346	R. R. repairs,	107	Guard by boxing belts where running near floor in carpenter shop; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
347	Printing,	37	Cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by secure railing fly-wheel and crank of engine.	Complied.
348	Embossing and printing,	8	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
349	Job printing,	34	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
350	Printing,	44	Cover or sink flush all projecting set-screws in collars on main and counter shafting; box belt in press room; guard by secure railing fly-wheel and crank of engine; provide bars or gates to all elevator openings, and keep closed when elevator is away from same.	Complied.
351	Manilla paper,	47	Guard by bars or gates elevator openings in finishing and engine rooms, and keep closed when elevator is away from same; guard by railing openings in floor of cutter and dusting rooms; cover or sink flush all projecting set-screws; provide hand rail to stairway leading to water-wheel; provide suitable passageway in basement to shafting east side of building.	Complied.
352	Writing paper,	50	Provide casing for pulley opening in floor of basement; guard belt in rag room to prevent crossing under same.	Complied.
353	Writing and envelope paper,	90	Guard by secure railing all openings in floor of roller room, also in bleaching room; guard by gates, bars, or chains all elevator openings and keep closed when elevator is away from same; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
354	Copying books, presses,	18	Cover or sink projecting set-screws in collar and coupling on main shaft near hanger.	Complied.
355	Hollow and hardware,	54	Cover or sink flush projecting set-screw in collar on shaft in tumbler room.	Complied.
356	Shoe uppers,	50	No order.	
357	Brass castings,	25	Provide better water-closet accommodations for employees.	Complied.
358	Confectionary,	60	Guard by secure railing fly-wheel to engine.	Complied.
359	Light hardware,	200	Thoroughly clean polishing and buffing room, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
360	Cigars,	90	Provide some system for the better ventilation of girls stripping room on 3d floor, and for cigar making department on 4th floor.	Complied.
361	Machinery,	6	Thoroughly clean factory, and keep the same as clean as the nature of the business will permit; cover or sink flush projecting set-screws in collars on counter shaft to upright drill.	Complied.
362	Wood patterns,	5	No order.	
363	Wood work,	10	Securely guard by boxing pulleys and belts to planer on 1st floor; box belt through floor, 2d story; cover or sink flush projecting set-screws in collars on main shaft, 1st floor.	
364	Hangers and shafting,	10	Provide better water-closet accommodation; cover or sink flush all projecting set-screws in collars on main and counter shafting.	
365	Iron castings,	35	Provide better water-closet accommodation for foundry and pattern room employees.	Complied.
366	Machinery,	14	No orders.	
367	Carriages,	15	Provide rails or gates for all elevator openings, and keep closed when elevator is away from same; provide better water-closet accommodation for employees.	Complied.
368	Spring beds,	15	No orders.	
369	Hardware,	41	Guard by boxing low shafting driving emery wheels in forging room; securely guard fly-wheel to engine.	Complied.
370	Steam specialties,	20	Provide better water-closet accommodations for first floor.	Complied.
371	Carriage hardware,	50	Provide hangers for press belts to drop on when thrown off from driving pulleys; securely guard sleeve couplings on main shaft in basement and in forging room; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
372	Carriages,	40	No orders.	
373	Cigars,	61	No orders.	
374	Silk,	15	Guard driving pulley on end of spinning frame, 1st floor; guard all flange couplings; guard projecting set-screws on counter shaft, 1st floor.	Complied.

375	Carriage hardware,	51	Securely guard flange couplings on main and counter shafting; clean and disinfect water-closets, and keep same in good sanitary condition; securely guard gears to water-wheel, in wheel pit.	Complied.
376	Photographers supplies,	58	Securely guard low shafting and pulleys on 3d floor, building "E"; repair flooring in 3d story, "B" building; provide better water-closet accommodations for employees, and keep same in good sanitary condition; cover or sink flush all projecting set-screws in collars on main and counter shafting; securely guard all low shafting and pulleys in saw rooms, 2d and 3d floors, also in basement, building "F."	Complied.
377	Needles,	40	Provide better water-closet accommodations for female employees, and keep same in good sanitary condition; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
378	Laundrying,	15	No orders.	
379	Malt liquors,	12	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
380	Pies,	35	No orders.	
381	Bread, cakes and pies,	25	No orders.	
382	Paper,	19	Securely guard driving pulleys and gears to screen machines, south end of screen machine room; securely guard flange couplings and projecting set-screws on shafting in digester room; repair trap door in floor of digester room, and keep closed when not in use.	Complied.
383	Cutlery and plated ware,	112	Cover or sink flush all projecting set-screws in collars on main or counter shafting; guard by boxing up and down belt in German silver polishing room; provide some system for the better ventilation of steel polishing and buffing rooms.	
384	Feldspar,	7	No order.	
385	Spoons and forks,	73	Guard by boxing belt running through floor, 2d story; guard by boxing belt where running from main to counter shafting near floor, 2d story; cover or sink flush projecting set-screw in collar on main shaft; provide some system for the better ventilation of polishing room, 3d floor.	Complied.
386	McIntosh and rubber goods,	150	Cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by secure railing crank to engine.	Complied.
387	Insulated wire,		Provide hand railing to stairway from 3d to 4th story; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
388	Brass and German silver goods,	50	No orders.	
389	Wheels and spokes,	75	Provide some system for taking off excessive dust generated in spoke turning department, 1st floor.	
390	Spoons and forks,	67	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; provide some system for the better ventilation of polishing room, 2d and 3d story.	
391	Fancy brass goods,	220	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
392	Cutlery, silver and plated ware,	300	Cover or sink flush all projecting set-screws in collars on main and counter shafting; provide some system for the better ventilation in all polishing rooms especially in steel shop; thoroughly clean polishing rooms, and keep same as clean as the nature of the business will permit; provide better system for keeping elevator openings closed when elevators are away from same in steel and German silver shops.	
393	Silver and plated ware,	102	Cover or sink flush all projecting set-screws in collars on main and counter shafting; provide some system for the better ventilation in polishing rooms on 2d and 3d floor; guard by railing elevator openings to prevent crossing over same when lifts are down.	
394	Plated ware,	300	Cover or sink flush all projecting set-screws in collars on main and counter shafting; put gates at elevator openings, in old building, in working order, and keep closed when elevator is away from same.	Complied.
395	Cotton goods,		Not running.	
396a	Woolen dress goods,	150	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
396b	Paper binding board,	15	Box belt where running through floor.	Complied.
397	Paper binding board,	8	Guard openings in floor by casing or railing around same.	Complied.
398	Woolen unions,	112	Cover or sink flush all projecting set-screws in collars on counter shaft.	Complied.

399	Knit goods,	75	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
400	Knit goods,	30	Cover or sink flush projecting set-screws in collars on main and counter shafting; box belt where running through floor in 2d story, spinning room.	Complied.
401	Paper binding board,	8	Guard by secure railing stairway opening to basement; box belt running through floor; guard by secure railing fly-wheel of engine; provide suitable water-closet accommodation.	Complied.
402	Soap,	62	Guard by secure railing fly-wheels of both engines; guard by railing elevator openings in upper factory to prevent crossing over same; provide some system for the better ventilation of ivorene room, 3d story, upper factory.	Complied.
403	Hog leather,	6	No orders.	
404	Butter,	4	No orders.	
405	Boxes,	8	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
406	Spoons and lamp fixtures	73	Guard elevator opening on 1st floor by secure railing; provide better water-closet accommodations for male employees; thoroughly clean and disinfect water-closets for female employees, and keep same in good sanitary condition.	Complied.
407	Knit underwear,	175	Guard by railing elevator openings on 1st and 4th floor, main building to prevent crossing over same when automatic lifts are down; thoroughly clean water-closet on 1st floor, and keep same in good sanitary condition; replace self-oilers in spinning room on main and counter shafting, or sink flush projecting set-screws in collars on said shafting.	Complied.
408	Hardware,	50	Guard by secure railing stairway opening in floor to wheel pit; cover or sink flush projecting set-screws in collars on main and counter shafting; relay flooring to water-closet; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove excessive dust from the polishing room.	Complied.
409	Brass castings,	18	No orders.	
410	Light hardware and electro plating,	8	Cover or sink flush projecting set-screws in collars on main shaft.	Complied.
411	Flour and feed,	9	Change entrance to wheel pit, to give more space between stairs and belting, or change line of shafting.	Complied.
412	Castors,	10	Cover or sink flush all projecting set-screws in collars on main and counter shafting; securely guard by railing fly-wheel to engine.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
413	Watch keys and case springs,	15	Introduce and operate within three months from date of this order such appliances or devices as will remove the excessive dust from the polishing and buffing rooms.	Complied.
414	Rivets, springs, etc.,	37	Provide hangers for belts to keep same from running on shafting when not in use; provide rubber or felt washers to emery wheels; guard by secure covering gearing on overhead shaft; cover or sink flush all projecting set-screws.	Complied.
415	Machinery and tools,	10	No orders.	
416	Planks, posts, etc.,	9	No orders.	
417	Wagon wheels,	50	Box driving belts through floor in the 4th story not less than four feet high; securely guard flange couplings on main shaft in basement.	Complied.
418	Printing,	30	No orders.	
419	Printing,	60	No orders.	
420	Publishing,	21	Thoroughly clean composing room, also the press room, and keep both as clean as the nature of the business will permit; clean and disinfect water-closet, and keep same in good sanitary condition.	Complied.
421	Printing,	12	No orders.	
422	Fire arms,	447	Put ventilators in roof of blacksmith shop in proper working order; securely guard crank of engine in west armory; guard elevator opening, 2d floor, west armory by secure railing.	Complied.
423	Ale and porter,	9	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
424	Printing and binding,	9	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
425	Corsets,	18	Put gate at elevator opening, 4th floor, in good working order, and keep closed when elevator is away from same.	Removed.
426	Publishing,	29	No orders.	
427	Decorated glass ware,	20	Guard by secure railing stairway leading to basement, also on 3d floor and attic.	Complied.

428	White metal,	31	No orders.	
429	Hats,	150	Provide such supports as are necessary to securely sustain presses; protect hand elevator opening in trimming room by higher railing; securely guard platform in boiler room, and end of sizing machine and tip stretcher, by railing; cover set-screws in couplings in finishing room; guard pulleys in forming and blower rooms; guard elevator and belts to box shop; clean and put water-closet in good sanitary condition.	Complied.
430	Wood filler,	50	No orders.	
431	White and colored papers	30	Cover or sink flush projecting set-screws in collars on main shaft in 2d story and basement; guard by secure railing opening in floor where gearing is exposed; provide better water-closet accommodations for male employees.	Complied.
432	Colored paper,	17	Guard by secure railing gearing in basement; disinfect water-closets, and keep same in good sanitary condition.	Complied.
433	Tissue paper,	29	Introduce and operate within three months from date of this order such appliances or devices as will remove excessive dust from rag room.	Complied.
434	Press paper,	7	Cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by secure iron railing fly-wheel and crank to engine.	Complied.
435	Copy books,	54	Cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by railing opening in floor to wheel pit; introduce and operate within three months from date of this order such appliances or devices as will remove excessive dust in rag room where females are employed.	Complied.
436	Underwear,	87	Cover or sink flush all projecting set-screws in collars on main and counter shafting; provide bars or chains to all elevator openings, and keep closed when elevator is away from same.	Complied.
437	Screws,	6	Cover or sink flush all projecting set-screws in collars on main shaft.	Complied.
438	Wood work,	10	Guard by secure railing fly-wheel to engine; guard by secure railing stairway opening to basement.	Complied.
439	Motors and dynamos,	120	Cover or sink flush all projecting set-screws in collars on main shaft; thoroughly clean water-closet, and keep same in good sanitary condition.	Complied.
440	Machinery,	5	No orders.	
441	Wood sawing,	8	Securely guard driving pulley and belt to saw frame.	Complied.
442	Carriages,	15	No orders.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
443	Brass castings,	18	Guard flange coupling and projecting set-screws on main shaft.	Complied.
444	Vehicles,	7	Securely guard set-screws in coupling and in collar on main shaft.	Complied.
445	Wagons,	12	No orders.	
446	Publishing,	18	Securely guard flange couplings on main shaft in basement; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
447	Vehicles,	11	Thoroughly clean and disinfect water-closet.	Complied.
448	Carriages,	4	No orders.	
449	Electric power,	4	Provide some safety shipper for belt on dynamo "A"; provide more secure guard for wheel pit by additional railing; guard by railing crank and rod of engine.	Complied.
450	Brass and bronze goods,	18	Provide hangers for all press and machine belts, to prevent same from running on shafting when not in use.	Complied.
451	Typewriting machines,	30	Cover or sink flush all projecting set-screws in collars on main shaft, 1st floor.	Complied.
452	Brass buttons,	70	Securely guard by boxing all shafting in basement where passage is made under same; securely guard all flange couplings; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
453	Wood work,	75	Box belts running through floor, 1st story; put gate at elevator opening, 3d floor, in proper working order, and keep closed when elevator is away from same to prevent crossing over automatic doors; securely guard by boxing all pulleys and belts to planers in mill room, 1st floor; cover or sink flush all projecting set-screws in collars on shafting, 2d floor; provide some system for removing excessive dust generated in mill room, 1st floor, within three months from date of this order; guard by secure railing or gates elevator openings in new building.	In process
454	Electric power,	3	No orders.	
455	Brass castings,	4	No orders.	
456	Butter and cheese,	9	Securely guard fly-wheel to Westinghouse engine.	Complied.

457	Machinery,	5	No orders.	
458	Mineral waters,	9	Thoroughly clean factory, and keep the same as clean as the nature of the business will permit; provide better water-closet accommodations for employees.	Complied.
459	Presses,	40	Cover or sink flush all projecting set-screws in collars on main and counter shafting; true up main shaft and tighten hangers in "L" building; introduce and operate within 3 months from date of this order such appliances or devices as will remove excessive dust in polishing room.	Complied.
460	Coffin hardware,	66	Cover or sink flush all projecting set-screws in collars on main and counter shafting; provide railing for opening in floor to hoistway, 2d story.	Complied.
461	Carpets,	1,500	Guard by secure railing fly-wheel of engine in dye house; cover or sink flush all projecting set-screws in collars on main and counter shafting; guard by bars or chains elevator opening at No. 3 mill, and keep closed when elevator is away from same; guard by secure railing crank of main engine; repair railing for main belt.	Complied.
462	Silks,	1,600	Guard by secure railing crank of engines in old and lower mills; box belts in noil yarn room where running through floor in lower mill; guard by bars or chains elevator opening near dry room No. 4 mill, and keep closed when elevator is away from same; guard gearing of Jaquard looms in weaving shop.	
463	Woolen cassimeres and worsteds,	350	Cover or sink flush all projecting set-screws in collars on shafting; relay flooring of scouring and fulling rooms, lay flooring flush to scouring machines; provide hatches in floor of fulling room where valves are located, and keep same closed when not in use; guard by bars, chains, or gates elevator openings in wool drying shop, and keep closed when elevator is away from same; provide substantial belt shipper to wool dryer; guard gearings on scouring, card, garnet, and gig machines; box belt where running through floor machine room; provide substantial railing to stairway opening in picking room, and main stairway landings; provide hand rail to stairway in picking room, and from main mill to boiler house; provide better water-closet accommodations for weaving, spinning, card, and fulling rooms; box belt through floor of spinning room; strengthen flooring of spinning room; guard gearing of spinning machines; repair and keep in good working order elevators in main building.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
464	Cotton warps and novelty yarns,	275	Cover or sink flush all projecting set-screws in collars on all shafting; true up counter shaft, 2d floor, lower mill; cover holes in flooring, 2d story, lower mill.	Complied.
465	Underwear,	170	No orders.	
466	Rolled steel,		Not running.	
467	Tissue paper,	14	Guard by boxing gears to rolling machine; provide suitable passageway to wheel pit.	Complied.
468	Sewing silk,	40	Cover or sink flush projecting set-screws in collars on all shafting.	Complied.
469	Hand trucks,	14	Cover or sink flush projecting set-screws in collars on all shafting; guard flange coupling on main shaft, 1st floor; guard by secure railing fly-wheel of engine; box belts running through floor, 2d story.	
470	Paper,	79	Cover or sink flush projecting set-screws in collars on all shafting; guard by secure railing fly-wheels of engines in basement and 1st floor; guard overhead gearing on 1st floor; provide hand rail to steps over shafting leading to engine room; provide railing to passageway of overhead pulleys; provide railing to stairway opening in grist mill.	Complied.
471	Tissue and light weight manillas,	46	Guard by secure covering gears to rolling machines, in both machine rooms; box belt through floor in rotary room; guard by railing stairway opening from 1st floor to basement.	Complied.
472	Chucks,	50	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
473	Paper machinery,	12	Cover or sink flush projecting set-screws in collars on main shafting.	Complied.
474	Book paper,	232	Guard all elevator openings by bars, chains, or gates, and keep closed when elevator is away from same; securely guard by covering gearing in wheel pit; repair flooring in No. 3 machine room, and No. 5 rotary room.	Complied.
475	Silk thread,	200	Guard by secure covering gears on silk winders; disinfect water-closets, and keep same in good sanitary condition.	Complied.

476	Gin,	9	Cover or sink flush projecting set-screws in collars on all shafting; box belts where running through floor in 1st and 2d story.	Complied.
477	Special machinery,	35	Guard pulley over Stiles punch press as suggested by inspector; guard electric motor near stairway, 4th floor; provide hand rail for stairways from 1st to 2d, and from 2d to 3d floors.	Complied.
478	Brooms,	5	No orders.	
479	Wood work,	6	Cover or sink flush projecting set-screws in collars on counter shaft, 1st floor; guard low pulleys and belts to moulding machines, 1st floor; guard low driving pulley to band saw; box belt running through floor 2d story.	Complied.
480	Wood work,	23	Guard projecting bolts on couplings main shaft, 1st floor; guard by boxing all low pulleys and shafting to wood working machines, 1st floor; cover or sink flush projecting set-screws in collars on all shafting; guard by bars or chain elevator landing, 2d floor.	Complied.
481	Doors and mantels,	5	Guard by boxing belt running through floor 1st story.	Complied.
482	Provision house,	8	No orders.	
483	Sash and doors,	15	Guard all low shafting and pulleys to moulding and planing machines; provide better water-closet accommodation for employees; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
484	Machinery,	5	No orders.	
485	Carriages,	7	Provide better water-closet accommodations, and keep same in good sanitary condition.	Complied.
486	Brass castings,	9	Provide better water-closet accommodation, and keep same in good sanitary condition.	
487	Coach lamps,	38	Provide some better system for ventilating glass cutting room; provide new flooring for glass department, 3d floor; and for glass cutting department, 1st floor; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
488	Laundering,	60	Cover or sink flush projecting set-screws in collars on main shaft, 1st floor; guard by secure railing fly-wheel of engine.	Complied.
489	Electric power,	6	No orders.	
490	Suspender buckles,	72	Guard by boxing shafting in tumbling barrel room, where passage is made under same; guard by secure railing stairway from 1st floor to basement; thoroughly clean buffing room, and keep same as clean as the nature of the business will permit.	Complied.
491	Paper boxes,	75	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
492	Gilt mouldings,	7	No orders.	
493	Car registers,	14	Cover or sink flush all projecting set-screws in collars on counter shafting; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
494	Leather,	6	Cover or sink flush projecting set-screws in collars on all shafting.	Complied.
495	Blacksmithing,	14	Clean and disinfect water-closet, and keep the same in good sanitary condition.	Complied.
496	Provision house,	15	Put safety catch on front elevator in good working order to prevent accident to persons employed, in event of accident to shipper, rope or hoisting machinery.	Complied.
497	Brass castings,	3	No orders.	
498	Horse collars,	19	Clean and disinfect water-closet in basement, and keep same in good sanitary condition; guard belt and pulley to cutting machine, 2d floor; cover or sink flush projecting set-screws in collars on main shaft.	Complied.
499	Carriage poles,	6	Thoroughly clean factory, and keep the same as clean as the nature of the business will permit.	
500	File cutting,	7	No orders.	
501	Printing,	7	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
502	Iron and steel keys,	30	Provide some safe method for adjusting belt to press in press room; cover or sink flush projecting set-screws in collars on all shafting; provide some system for removing the excessive steam generated in pickling room.	Complied.
503	Electric Power,	6	Securely guard by iron railing all dynamos, and governor wheels of engines; thoroughly clean dynamo room, and keep same as clean as the nature of the business will permit.	Complied.
504	Mercantile building,	3	Provide such safeguard on stairs enclosing elevator as shall be sufficient to guard against accident to persons on said stairs by elevator.	Complied.
505	Machinery and castings,	6	Box main shaft, 2d floor; clean and disinfect water-closet.	Complied.
506	Paper and wood boxes,	12	Put spring on elevator door to make door self closing.	Complied.

507	Pottery,	45	Guard belt on 2d floor securely; put spring on elevator door to make door self closing.	Complied.
508	Furniture,	16	Securely guard main pulley on moulding machine, 2d floor.	Complied.
509	Laundering,	7	No orders.	
510	Printing,	7	No orders.	
511	Wood work,	30	No orders.	
512	Grain elevator,	3	No orders.	
513	Grain elevator and wood work,	6	No orders.	
514	Harness and wagons,	20	Guard by secure railing fly-wheel of engine; cover or sink flush all projecting set-screws in collars on main and counter shafting; put ventilators in roof of saw room; provide better water-closet accommodations for employees.	Complied.
515	Ship iron work,	5	No orders.	
516	Badges,	14	Guard by secure railing large driving wheel near floor, 1st story.	Complied.
517	Packing house,	13	Guard by secure railing fly-wheel to engine; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
518	Packing house,	200	Box belts running through floor in salt room; provide some safety device or appliance on elevator so doors at all elevator openings can be closed by action of the elevator car; cover or sink flush projecting set-screws in collars on all shafting; thoroughly clean entire packing house, and keep the same in as clean a condition as the nature of the business will permit.	Complied.
519	Plumbing,	15	No orders.	
520	Shirts,	20	Securely guard by boxing under shafting to sewing machine table.	Complied.
521	Furniture,	5	Securely guard by boxing low shafting on 1st floor.	Complied.
522	Carriages,	7	No orders.	
523	Carriage repairing,	5	No orders.	
524	Wood work,	14	Securely guard by boxing driving pulleys to variety machine; guard by secure railing fly-wheel of engine; guard by boxing belt running through floor, 2d story.	Complied.
525	Carriage iron work,	4	Provide better water-closet accommodation for employees.	Complied.
526	Cash registers,	43	Provide hangers for press belts in machine room, 1st floor; guard by secure railing fly-wheel of Twiss engine; guard by boxing belt running through floor, 2d story, annex building.	Complied.
527	Starch,	20	No orders.	

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
528	Grain elevator,	5	Guard by boxing sides of elevator loft, and stairway leading from loft to 1st floor.	Complied.
529	Provision house,	6	No orders.	
530	Carriages,	10	Provide secure railing for sides of elevator openings, and guard rail inside of elevator doors.	Complied.
531	Sewing machine attachments,		Securely guard by boxing low shafting in polishing and buffing rooms.	
532	Fire brick,	15	Provide some system for removing excessive heat and dust in moulding room, 2d story.	Complied.
533	Meat Packing,	30	Securely guard by bars, chains or gates, all elevator openings, and keep closed when elevator is away from same.	Complied.
534	Cement pipes,	12	Box belt running through floor, 2d story.	Complied.
535	Beer,	12	Guard by secure railing fly-wheel to Ellison engine; cover or sink flush all projecting set-screws on main and counter shafting.	Complied.
536	Cotton yarns,	18	Box large pulley and belt driving speeder machine, 1st floor; box driving pulleys and belt on railway heads, 1st floor; provide chain guards to elevator openings on second and 3d floors, and keep the same across opening when elevator is away from said openings; box main belt, packing room; guard by cross bars to outside door openings, 2d floor; cover or sink flush projecting set-screws in collars on all shafting; thoroughly clean rooms, and keep same as clean as the nature of the business will permit.	Complied.
537	Monuments,	100	Guard by secure iron railing piston rod and gears to hoisting engine; guard by secure iron railing piston rod to engine driving polishing machine; cover or sink flush set-screws in collars on main shaft in polishing room.	Complied.
538	Monuments,	200	Guard by secure iron railing main hoisting engine; cover or sink flush set-screws on main shaft of vertical and upright polishing machines; guard fly-wheel to engine driving polishing room.	Complied.

539	Fish oil,	50	Guard by secure iron railing two bars high fly-wheel to main engine; cover or sink flush projecting set-screws in collars on all shafting, 1st floor; extend flooring to cover openings in floor in pumice rooms.	Complied.
540	Wool scouring,	10	Box main belts in upper mill running through floor to drying machine, 4th floor; box main belt to picker, 3d floor; cover or sink flush set-screws in collars on main shaft, 1st and 2d floors.	Complied.
541	Wool scouring,	12	Cover or sink flush projecting set-screws in collars on main shaft, 2d floor, and on scouring machine, 1st floor; guard by secure railing main gears in wheel room.	Complied.
542	Castings and iron jobbing	35	True up and balance emery wheel; guard by secure iron railing crank and piston of main engine; cover or sink flush projecting set-screws in collars on main shaftings.	Complied.
543	Plumbers supplies,	15	Guard by secure iron railing driving pulley and belt to engine.	
544	Brass castings,	3	No orders.	
545	Monuments,	5	No orders.	
546	Doors, blinds and sashes,	27	Box driving pulley and belt to tenoning machine, 2d floor; box driving pulley and belt to panel raising machine, 1st floor; provide cross bars to outside door openings, 2d floor.	Complied.
547	Printing,	8	Box belt running through floor to 2d story; cover or sink flush projecting set-screw in collar on main shaft, 2d floor.	Removed.
548	Ticket punches,	2	No orders.	
549	Printing,	16	No orders.	
550	Printing,	9	No orders.	
551	Extracts,	55	No orders.	
552	Mineral waters,	6	No orders.	
553	Exhaust pipes,	28	No orders.	
554	Steam stone cutting,	12	Cover or sink flush projecting set-screw in collar on main shaft.	Complied.
555	Mouldings,	7	Cover or sink flush projecting set-screw in collar on counter shaft near main belt pulley; cover opening in floor, 1st story, or guard same by casing to the heighth of 6 inches; operate blower to take off excessive dust generated in planer room.	Closed.
556	Ale and porter,	6	Cover or sink flush projecting set-screw in collar on counter shaft, 3d floor.	Complied.
557	Wood work,	15	Cover or sink flush all projecting set-screws in collars on shafting; repair stairway and provide hand rail to same.	Complied.
558	Drop forgings,	6	No orders.	
559	Cornices,	9	No orders.	

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
560	Fancy pottery,	50	Cover or sink flush projecting set-screw in collar on main shaft, 1st floor; provide casing to openings in floors of 2d and 3d story, south side of building, to the height of at least 6 inches; box belt where running near floor in basement.	Complied.
561	Coiled pipe,	10	No orders.	
562	Brick,	40	Guard by secure iron railing crank of engine; guard by boxing main belt at main shaft; thoroughly clean and disinfect water-closet, and keep same in good sanitary condition.	Complied.
563	Brick,	25	Disinfect water-closet, and keep same in good sanitary condition.	Complied.
564	Brick,	20	Provide better water-closet accommodations for employees.	Complied.
565	Brick,	26	No orders.	
566	Brick,	10	No orders.	
567	R. R. repairs,	63	No orders.	
568	Publishing,	6	No orders.	
569	Publishing,	7	No orders.	
570	Printing,	26	Cover or sink flush projecting set-screws in collars on all shafting.	Complied.
571	Blank books,	17	No orders.	
572	Publishing,	8	No orders.	
573	Publishing,	8	No orders.	
574	Beer,	25	No orders.	
575	Cigars,	59	Provide better ventilation in large room and in stripper department.	Complied.
576	Brick,	40	Guard by secure iron railing fly-wheel of engine; provide suitable water-closet accommodations for employees.	Complied.
577	Brick,		Not running.	
578	Wood engraving,	30	No orders.	
579	Book binding,	6	No orders.	
580	Brushes,	5	No orders.	
581a	Repair shop,	16	Repair and thoroughly clean water-closet for employees of repair shop, and keep same in good sanitary condition.	Complied.
581b	Sky lights,	6	Provide suitable water-closet accommodation for employees.	Complied.

582	Machinery,	101	Securely cover or sink flush all projecting set-screws in collars on counter shafting, west side of building in press room, and near elevator.	Complied.
583	Printing presses,	80	Cover or sink flush projecting set-screws in collars on main shaft, polishing room, and on counter shaft west side of main building.	Complied.
584	Bicycles,	100	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
585	Carpet paper lining,	5	Replace bars to elevator openings on 2d and 3d floor, and keep closed when elevator is away from same; box main belt running through 2d floor; cover openings in floor under vise bench; cover or sink flush projecting set-screws in collars on counter shaft, 1st floor; thoroughly clean and disinfect water-closet.	Complied.
586	Monuments,	10	Securely guard by iron railing crank and piston of engine; thoroughly clean and disinfect water-closet.	Complied.
587	Laundering,	10	Guard by secure railing crank and piston of engine; cover or sink flush projecting set-screws in collars on main shaft, 1st floor.	Complied.
588	Laundering,	7	Guard by secure railing balance wheel and driving pulley of main engine; cover or sink flush projecting set-screws in collars on counter shaft, 1st floor.	Complied.
589	Paper boxes,	35	No orders.	
590	Knitting silk,	39	No orders.	
591	Printing,	6	No orders.	
592	Ship building,	30	Guard by secure iron railing large driving pulley and belt to saw mill machine, 2d building; guard by boxing driving pulley and belt to hoisting machine; guard by secure railing fly-wheel and driving pulley to main engine.	Complied.
593	Monuments,	5	Guard by secure railing fly-wheel of engine.	Complied.
594	Paper,	7	Guard by secure iron railing large gears on rotary boiler, 2d floor; guard by secure railing fly-wheel and driving pulley of main engine; guard securely by iron or wood bars driving pulleys and speed gears to paper machine; cover or sink flush projecting set-screws in collars on paper machine; replace bars across hoistway doors when not in use.	Complied.
595	Wrapping paper,	22	Guard by secure railing large driving pulleys and gears to paper machines in upper and lower mills; provide cross bars to large doors, 2d floor; box main belt of paper machine upper mill.	Complied.
596	Monuments,	12	No orders.	

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
597	Vices,	28	Guard by boxing driving pulleys and belts to blower, machine shop; guard by securely boxing large driving gears of tapping machine.	Complied.
598	Worsteds,	31	Guard by secure railing balance wheel and driving pulley of engine; case main belt driving counter shaft, 2d floor; provide better facilities for male water-closet, 1st floor; thoroughly clean and disinfect female water-closet, 2d floor.	Complied.
599	Woolen goods,	83	Provide gates or hatches to all elevator openings, and keep closed when elevator is away from same; cover or sink flush projecting set-screws in collars on main and counter shafting; guard by secure iron railing crank and piston and fly-wheel of main engine, and case fly-wheel pit by boards six inches high; guard by partition or secure railing opening in passageway south end of card room.	
600	Ship repairing,	325	Guard by secure railing fly-wheel and piston to engine, joiner shop; box driving pulley and belt of saw machine; extend guard rail protecting crank and piston to fly-wheel of main engine; box driving pulley and belt to band saw; box large driving pulleys and gears to hoisting machine; securely guard main driving belt and pulleys to large saw mill.	Complied.
601	Fish oil,	16	No orders.	
602	Iron and brass castings,	6	Guard by secure railing crank, piston, and fly-wheel of main engine.	Complied.
603	Fancy cloakings,	74	Cover or sink flush projecting set-screws in collars on all shafting; thoroughly clean rooms, and keep same as clean as the nature of the business will permit.	Complied.
604	Extracts and dyes,	25	Guard by iron rails large vacum punch, 2d floor, extract building; provide hand rail to raised platform from old pan to still; provide guard rails to raised platform in wheel room; guard by boxing and wood rails, coupling and driving gears to cutting machine, 1st floor.	Complied.
605	Leather,	48	No orders.	
606	Medicated soap,	17	No orders.	

607	Silox,	14	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove, so far as the nature of the business will permit, the excessive dust from the atmosphere of the bothing and drying rooms; provide hand rails on all raised walks at line shafting and gearing, place raised board 8 inches high to same walk to guard gears in grinding room; guard by secure iron railing balance wheel and belt of engine in dry room; cover or sink flush projecting set-screws in collars on all shafting.	In process
608	Car building,	63	Guard pulleys and belts to large planer in wood working shop; guard low pulley to band saw; guard by secure railing fly-wheel of engine.	Complied.
609	Stairs,	10	Guard by boxing driving shaft on raised part of 2d floor.	Complied.
610	Carriages,	20	No orders.	
611	Coach lamps,	20	Securely guard by boxing belt running through floor, 2d story; provide better water-closet accommodations for employees.	Complied.
612	Chemicals,	6	Provide better water-closet accommodations for employees.	Complied.
613	Axles,	4	Provide better water-closet accommodations for employees.	Complied.
614	Plumbers supplies,	18	No orders.	
615	Laundering,	42	Guard by boxing low pulley to water extractor, 1st floor; securely guard gears to ironing machine, 2d floor.	Complied.
616	Hardware,	10	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
617	Pretzels,	5	No orders.	
618	Lithographing,	4	Cover or sink flush projecting set-screws in collars on all shafting.	Complied.
619	Files,	4	No orders.	
620	Wood work,	20	Guard by secure railing fly-wheel to engine; guard by boxing low pulleys to band saw, 1st floor; provide some safe method for guarding pulleys and shaft to variety machine, 2d floor.	Complied.
621	Tools,	6	Guard by boxing driving shaft in basement; cover or sink flush projecting set-screws in collars on all shafting; clean and disinfect water-closet.	Complied.
622	Carriages,	18	Provide better water-closet accommodations, and keep same in good sanitary condition; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
623	Baking,	31	Cover or sink flush all projecting set-screws in collars on shafting; guard all elevator openings by bars or gates; guard by railing fly-wheel to engine; guard by boxing belts running through floor in mixing room; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
624	Traps and cows bells,	16	Put up hangers for press belts, to keep same from running on shafting when not in use; clean and disinfect water-closets, and keep same in good sanitary condition; partition off boiler from main room.	Complied.
625	Bottling,	4	No orders.	
626	Beer,	16	Guard by boxing belt running through floor, 4th story.	Complied.
627	Grist and saw mill,	5	Guard by secure railing fly-wheel to engine.	Complied.
628	Light hardware,	104	Guard by secure railing fly-wheel to engine; provide hangers for press belts to keep same from running on shafting when not in use; thoroughly clean factory, and keep the same as clean as the nature of the business will permit.	Complied.
629	Carriages,	5	No orders.	
630	Flour and feed,	5	Guard by secure railing fly-wheel to engine.	Complied.
631	Carriage wheels,	20	Guard by boxing driving belt through floor, 2d story; guard by boxing low shafting and pulley to band saw.	Complied.
632	Laundering,	23	Provide separate and suitable water-closet accommodation for female employees.	Complied.
633	Book binding,	10	No orders.	
634	Nuts,	8	Sink flush projecting set-screw in collar on counter shaft.	Complied.
635	Manilla paper,	25	Box main belts running through floor in machine room; guard driving gears of dryer machines; cover or sink flush all projecting set-screws in collars on shafting; repair flooring of machine room; guard by secure railing fly-wheel of engine in basement; lay flooring in basement, west of engine room, put hatches over gearing and bearings, also box belt located there; box belts running through floor of engine room; provide railed gangways to all bearings in wheel pit; provide hatchway over stuff chest.	Complied.
636	Paper boxes and hardware	12	No orders.	
637	Mouse traps,	12	Box belt running through floor at circular saw in basement; relay flooring over sluice way in basement.	Complied.
638	Wood turning,	5	No orders.	

639	Binders board,	17	Repair automatic lift at elevator opening, 1st floor, and keep closed when elevator is away from same; cover or sink flush projecting set-screws in collars on counter shaft, 1st floor, and in main shaft in finishing room; provide suitable stairway to wheel pit.	Complied.
640	Boards and planks,	6	Relay flooring in basement where timbers have rotted; provide suitable stairway from 1st floor to basement; repair flooring in first story.	Complied.
641	Light hardware,	5	No orders.	
642	Cotton baten and hosiery yarns,	15	Guard or sink flush projecting bolts in coupling on main shaft, old building; box belt running through floor, 2d story, old building; cut off projecting key on shaft of fly-wheel in engine room.	Complied.
643	Bolts, nuts, rules, and levels,	200	Cover or sink flush projecting set-screws in collars on shaft in rivet room, on main shaft in drop shop, and on all shafting in basement of rule shop.	Complied.
644	Cutlery,	123	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; cover or sink flush projecting set-screws in collars on all shafting; guard elevator openings by gates, chains or bars, and keep closed when elevator is away from same; guard by secure railing opening in floor of basement near engine room; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in trimming and buffing rooms; box belt running through floor in buffing room; provide seats to water-closets.	
645	Writing paper,	85	Guard by boxing speed gears to Fourdrinier machine; cover or sink flush projecting set-screw in collar on shaft in rag room; provide railed gangways for oiler in old mill wheel pit.	Complied.
646	Shears,	80	No orders.	
647	Mouse traps,	40	No orders.	
648	Sewing silk,	225	Box belt on 3d floor.	Complied.
649	Sewing silk,	42	No orders.	
650	Pins and wire novelties,	115	No orders.	
651	Machinery,	6	No orders.	
652	Hardware,	14	No orders.	
653	Hair pins,	15	No orders.	
654	Pocket cutlery,	78	Box belt on 2d floor.	Complied.
655	Cabinet hardware,	330	No orders.	

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
656	Knifes,	20	No orders.	
657	Pocket cutlery,	21	Guard by secure iron railing fly-wheel to engine.	Complied.
658	Clocks,	190	No orders.	
659	Scythes,	35	No orders.	
660	Bolts and nuts,	55	No orders.	
661	Printing,	11	No orders.	
662	Clocks,	29	No orders.	
663	Machinery,	5	Box belts running through floor, 1st story, and in pattern room.	Complied.
664	Cotton hosiery,	12	Box belts at winding machine and wringer.	Complied.
665	Underwear,	160	No orders.	
666	Shoes,	60	No orders.	
667	Coffin trimmings,	81	No orders.	
668	Coffin hardware,	37	No orders.	
669	Pins,	80	No orders.	
670	Underwear,	100	No orders.	
671	Yarn,	9	Guard by secure railing fly-wheel and main belt to engine.	Changed to water power
672	Spectacles,	50	No orders.	
673	Patterns and machinery,	12	No orders.	
674	Castings,	5	No orders.	
675	Edge tools,	60	No orders.	
676	Silk,	90	Guard belt of spooling machine.	Complied.
677	Hardware,	78	No orders.	
678	Book binders leather,	30	Guard main belt, 1st floor, between counter shafts.	Complied.
679	Cutlery,	81	No orders.	
680	Cotton duck,	80	No orders.	
681	Furniture,		Not running.	
682	Silk,	50	No orders.	
683	Underwear,	52	Box belt to governor on water wheel.	Complied.
684	Woolens,	250	Guard elevator hatchways by beveled protectors; cover or sink flush all projecting set-screws in collars; securely guard all couplings where near hangers or pulleys; provide suitable and sufficient water-closet accommodation on each floor for the use of persons employed.	In process

685	Power,	12	Guard spur wheels on engine by metal covers.	Complied.
686	Wood work,	26	Box belt to power morticing machine, 3d story.	Complied.
687	Laundering,	8	No orders.	
688	Laundering,	20	Box main belt running through floors of 1st and 2d story; provide separate and suitable water-closet for female employees.	Complied.
690	Terra cotta,	65	Guard gearing to pug mill; provide seats to water-closet, and keep said water-closet in good sanitary condition.	Complied.
691	Brick and terra cotta,	78	Guard by secure railing fly-wheel of engine; guard elevator openings by bars or chains and keep closed when elevator is away from same; thoroughly clean water-closets, and keep same in good sanitary condition; provide seats to the one used near shanty.	Complied.
692	Brick,	28	Provide suitable water-closet accommodations, and keep same in good sanitary condition.	Complied.
693	Brick,	26	Thoroughly clean water-closet, and keep same in good sanitary condition.	
694	Brick,	85	Guard by secure railing crank and fly-wheel to Brown engine; provide suitable water-closets for employees, and keep same in good sanitary condition.	In process
695	Brick,	45	Provide suitable water-closets, and keep same in good sanitary condition.	Complied.
696	Brick,	25	Guard by secure railing fly-wheel of engine; provide suitable water-closet accommodation for employees, and keep same in good sanitary condition.	Complied.
697	Brick,	20	Guard by secure railing fly-wheel of engine; provide suitable water-closet accommodation for employees, and keep same in good sanitary condition.	Complied.
698	Furnaces and heaters,	6	No orders.	
699	Carving,	6	No orders.	
700	Clock movements,	12	Box end of shafting where running near floor.	Complied.
701	Underwear,	100	Strengthen flooring north end of attic; box belt running through floor of attic; guard elevator openings by gates, bars, or chains, and keep closed when elevator is away from same; cover or sink flush projecting set-screws in collars on all shafting; prohibit the use of ladder in elevator well by removing same; box belts running through floor of card room.	Complied.
702	Incubators,	28	No orders.	
703	Clock cases,		Not running.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
704	Light hardware,	12	Guard by secure railing fly-wheel of engine.	Complied.
705	Steel fish rods,	13	Cover or sink flush projecting set-screws in collars on main shaft.	Complied.
706	Builders hardware,	1,400	Securely guard gearing and keys on punch press, in press room; cover or sink flush all projecting set-screws in collars on shafting; cover or sink flush projecting set-screws on friction clutches; guard elevator opening in grinding room to prevent crossing over same; cut off projecting bolts in sleeve couplings in machine room of screw department; securely guard gearing and keys on rolling machine; remove projecting screw in friction clutch, header room; cover or sink flush projecting set-screws in collars on all shafting in foundry; guard couplings on main shaft or replace by sleeve couplings.	Complied.
707	General hardware,	1,600	Cover or sink flush projecting set-screws in collars on all shafting; provide hangers for belts not in use to keep same from running on shafting; guard by boxing exposed belts to butt drill machines in butt drill room; provide new cable for No. 3 elevator "L" building.	Complied.
708	Mill machinery,	130	Guard all elevator openings by rails or gates; guard all plate couplings on main shaft; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
709	Underwear,	60	Guard by railing stairway leading from card room to 2d floor; box belt through floor spinning room, 3d story; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
710	Gas,	9	Extend railing so as to guard small driving wheels to Hampson engines.	Complied.
711	Knit goods,	120	Box belt running through floor, 3d story; set flush keys to sleeve couplings on main shaft; guard plate coupling, main shaft, picker room; cover or sink flush projecting set-screws in collars on all shafting.	
712	Machine screws,	80	Provide some system for removing the excessive dust generated in polishing room, withing three months from date of this order; provide better water-closet accommodation for female employees in machine screw room.	Complied.

713	Clocks,	500	Guard by railing low shafting case department; cover or sink flush projecting set-screws in collars on all shafting; provide hangers for belts to keep same from running on shafting when not in use; securely guard plate couplings in movement factory.	Complied.
714	Hardware,	306	Cover or sink flush projecting set-screws in collars on all shafting; securely guard plate couplings on shaft in forging room.	Complied.
715	Carriage hardware,	60	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; securely guard plate couplings on main shaft, 1st floor.	Complied.
716	Boring implements,	56	Securely guard plate couplings on main shaft, 1st floor; provide hand rail to stairs from 1st to 2d floor; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied. Complied.
717	Silver ware,	182	Cover or sink flush all projecting set-screws in collars on all shafting.	Complied.
718	Paper boxes and plush cases,	78	Cover or sink flush all projecting set-screws in collars on shafting in new building; box belt running through floor in new building; sink flush projecting set-screw in collar on shaft in basement of old building.	Complied.
719	Wire mattresses and iron beds,	20	Guard plate coupling on main shaft in machine room.	Complied.
720	Castings,	79	No orders.	
721	Cutlery and light hardware,	100	Cover or sink flush projecting set-screw in collar on main shaft in tumbler room.	Complied.
722	Printing,	13	Cover or sink flush projecting set-screws in collars on all shafting; securely cover set-screw in wooden pulley.	Complied.
723	Harness trimming,	7	Box belt running through floor; provide railed gangway to cog wheels.	Complied.
724	Envelopes and paper bags	55	Cover or sink flush all projecting set-screws in collars on shafting; box belts where running near and through floor in carpenter shop; provide railed gangway to water wheel bearing.	Complied.
725	Harness buckles,	230	Guard by secure iron railing crank and fly-wheel of engine; securely guard plate coupling on main shaft in tongue room; cover or sink flush projecting set-screw in collar on counter shaft in buckle room; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust in polishing room.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
726	Suspender buckles,	220	Cover or sink flush projecting set-screw in collar on main shaft; tighten or otherwise brace hangers for shafting in pickling room; provide hand rail to stairs in Oscar's room.	Complied.
727	Butts and hinges,	600	Cover or sink flush all projecting set-screws in collars on shafting.	
728	Needles,	8	No orders.	
729	Mouldings,	8	Guard by secure railing fly-wheel of engine; cover or sink flush projecting set-screw in collar on main shaft; thoroughly clean factory, and keep same as clean as the nature of the business will permit; clean water-closet, and keep same in good sanitary condition.	Complied.
730	Iron beds and wire mattresses,	5	Guard by secure railing fly-wheel of engine; cover or sink flush projecting set-screw in collar on main shaft, machine shop; guard plate coupling on main shaft; relay flooring of machine shop.	Removed.
731	Artificial ice,	6	Guard by secure iron railing balance and driving wheels to engine.	Complied.
732	Builders hardware,	850	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in following named rooms: Burckhardt's grinding room, padlock grinding room; Cooley's polishing room, and room 32 "B" 1; guard plate couplings on shafting in following named rooms: Burckhardt's grinding room, room 32 "B" 1, room 33 "B" 1, and in nail room, north end; true up main shaft in room 43 "C. B"; guard by secure railing crank of main engine and air pump, also fly-wheel of brass foundry engine; guard by bars or gates elevator openings in buildings 32 and 33, and keep closed when elevator is away from same; cover or sink flush projecting set-screws in collars on all shafting.	
733	Paste and paper boxes,	50	Guard elevator openings by bars or gates, and keep closed when elevator is away from same.	Complied.
734	Brick,	70	Guard by secure railing fly-wheel and crank of Corliss engine.	Will comply
735	Harness hardware,	14	No orders.	
736	Electric power,	7	No orders.	

737	Steam engines,	20	No orders.	
738	Mouldings,	25	Box belts running through floor of 2d story; box end of counter shaft, 1st floor, at iron frame, rip saw; guard by secure railing main belt and fly-wheel to engine; repair flooring to engine room; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in the planer room.	In process
739	Shirts,	26	No orders.	
740	Woolens,	120	Guard by secure railing fly-wheel to engine; cover or sink flush projecting set-screws in collars on all shafting in weaving room; box belts running through floor in card room; repair flooring in basement near gig machine and engine room.	
741	Paper,	115	Cover or sink flush all projecting set-screws in collars.	Complied.
742	Press paper,	19	Relay flooring of engine room in upper mill.	Complied.
743	Binders board,	18	Guard by secure railing crank and fly-wheel to engine; thoroughly clean factory, and keep the same as clean as the nature of the business will permit.	Complied.
744	Knit goods,	50	Cover or sink flush projecting set-screw on counter shaft for press.	Complied.
745	Soap,	13	Cover or sink flush projecting set-screws in collars on ends of main and counter shafts.	Complied.
746	Envelope paper,	50	Cover or sink flush projecting set-screws in collars on all shafting; provide some better system to carry off offensive gases generated in engine room.	
747	Card board,	6	Repair flooring of engine room.	
748	Card board,	5	Guard by boxing belts where running through floor, 1st story; relay flooring of 1st story.	Complied.
749	Straw board,	18	Cover or sink flush all projecting set-screws in collars on main and counter shafting.	
750	Needles,	10	Provide counter shafting on 2d floor to enable you to use pulley on main shaft, 1st floor, for the transmission of required speed to 2d story.	
751	Needles,	8	No orders.	
752	Motors and dynamos,	75	Provide hangers for press belts to keep same from running on shafting when not in use.	Complied.
753	Wrapping paper,	30	Securely cover or sink flush projecting set-screws in collars on all shafting; repair floor of engine room; box belts running through floor of engine room.	
754	Wool scouring,	40	No orders.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
755	Electric lights,		Not running.	
756	Wood turning,	8	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; box main belt running through floor, 1st story.	Complied.
757	Cotton picking,	5	No orders.	
758	Screw drivers,	5	No orders.	
759	Wood turning,	7	No orders.	
760	Axes and edge tools,	650	Cover or sink flush all projecting set-screws in collars on main and counter shafting; cover or guard by boxing holes in floors of box shops.	Complied.
761	Jude yarn,	15	Relay flooring in card and picker room.	Complied.
762	Safety fuse,	80	No orders.	
763	Lace curtains,	95	Guard by boxing belts running through floor of weaving room; cover or sink flush projecting set-screw in collar on shaft in ware room; repair flooring of scouring room.	Complied.
764	Woolens,	95	Cover or sink flush all projecting set-screws in collars; provide shipper for driving belt to wool picker; provide additional water-closet for male and one for female employees; provide more than one way of egress, by stairs on the inside or fire escape on the outside of building from 3d to 2d floor.	Complied.
765	Press paper,	12	Cover or sink flush all projecting set-screws in collars on shafting; guard by secure railing the opening above engine and stairs near water pump.	
766	Woolens,	50	Cover or sink flush all projecting set-screws in collars on shafting; guard by secure railing crank and fly-wheel to engine.	
767	Cotton yarn,	25	Cover or sink flush projecting set-screws in collars on all shafting; box main belt from engine to twisting room; provide some suitable device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery; thoroughly clean water-closets, and keep same in good sanitary condition.	

768	Cotton yarns,	12	Guard by secure railing crank and fly-wheel of engine; cover or sink flush all projecting set-screws in collars on shafting; provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery.	
769	Press paper,	12	Cover or sink flush projecting set-screws in collars on all shafting; securely guard by railing gears and belting in wheel house; thoroughly clean water-closet, and keep same in good sanitary condition.	Complied.
770	Tape,	19	Securely cover or sink flush all projecting set-screws in collars on main and counter shafting in No. 1 mill.	
771	Silk ribbons,	200	Cover or sink flush all projecting set-screws in collars on shafting; box belts running through floor in reeling room.	Complied.
772	Cotton thread,	78	No orders.	
773	Sewing silk,	12	Guard gearing on end of spinning machine.	Complied.
774	Silk thread,	15	Cover or sink flush all projecting set-screws in collars on all shafting; guard by secure railing crank and fly-wheel of engine.	
775	Sewing silk,	12	Provide hanger for belt hanging between pulleys, to keep same from running on shafting when not in use.	Complied.
776	Sewing silk,	17	Cover or sink flush projecting set-screw in collar on main shaft; cut off projecting key on shaft in basement.	Complied.
777	Cotton cloth,	140	Cover or sink flush projecting set-screw in collar on end of shaft, picker room; provide more than one way of egress by stairs on the inside, or fire escape on outside of building from 3d to 2d floor.	Complied.
778	Organ pipes,	15	Box belting running through floor in planing room; cover or sink flush projecting set-screw in collar on end of shaft in planing room.	Complied.
779	Shoddy,	30	Box main belt running from water wheel; guard by secure railing crank of engine.	Complied.
780	Silk thread,	20	No orders.	
781	Silk thread,	20	No orders.	
782	Cartridges,	35	No orders.	
783	Silk thread,	59	No orders.	
784	Paper boxes,	17	No orders.	
785	Woolen cloths,	44	No orders.	
786	Woolen yarns,	45	Guard by secure railing main belt and driving wheel to engine in card room of small mill.	Complied.
787	Carriages,	10	No orders.	
788	Wood work,		Not running.	
789	Leather belting,	12	Guard by secure railing crank, shaft, and fly-wheel to engine.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
790	Cotton thread,	125	Provide additional water-closet for men; provide more than one way of egress by stairs on the inside or fire escape on outside of building from 3d to 2d floor.	
791	Woolen cloths,	32	Guard by secure railing crank shaft and main belt to engine; box up shaft in picker room to prevent stock catching on it.	Complied.
792	Meal,	3	Provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery; cover or sink flush all projecting set-screws in collars; guard by suitable railing main belt running from engine room.	Complied.
793	Repair shop,	2	Cover or sink flush all projecting set-screws in collars.	Complied.
794	Cord clothing,	12	Cover or sink flush projecting set-screw in collar on shaft in leather room.	Complied.
795	Woolen cloth,	120	Cover or sink flush all projecting set-screws in collars; box belts running through floor of card room; provide more than one way of egress by additional stairs on the inside or fire escape on outside of building from 3d to 2d floor; provide additional water-closet for men; thoroughly clean water-closets, and keep same in good sanitary condition.	Complied.
796	Worsted cloth,	110	Not running.	
797	Woolen cloth,	50	Cover or sink flush all projecting set-screws in collars.	
798	Electric light,	3	Guard by secure railing main belt in basement.	Complied.
799	Machinery,	4	Cover or sink flush projecting set-screws in collars on shafting, machine room.	Complied.
800	Chucks,	4	Cover or sink flush all projecting set-screws in collars.	Complied.
801	Looms,	4	Guard by boxing bevel gearing.	Complied.
802	Woolen cloth,		Not running.	
803	Grindstones,	3	No orders.	
804	Woolen cloth,	60	Cover or sink flush projecting set-screws in collars on shafting; remove broken collar on end of shaft in weave room.	In process

805	Woolen cloth,	70	Provide gates or bars to all elevator openings, and keep closed when elevator is away from same; provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery; box main belt; cover or sink flush all projecting set-screws in collars on shafting.	In process
806	Woolen cloth,	50	Guard by boxing large belt in wareroom; cover or sink flush all projecting set-screws in collars of shafting in picker room; guard by gates or bars all elevator openings and keep closed when elevator is away from same; provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery.	In process
807	Cotton warps,	75	Cover or sink flush all projecting set-screws in collars on shafting; thoroughly clean water-closets, and keep same in good sanitary condition.	Complied.
808	Sewing silk,	474	No orders.	
809	Knit goods,	105	Cover or sink flush all projecting set-screws in collars on shafting; guard by secure iron railing crank and shaft to engine.	Complied.
810	Castings,	3	No orders.	
811	Paper boxes,	21	Provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery.	
812	Silk fish lines,	10	No orders.	
813	Monuments,	3	No orders.	
814	Worsteds and fancy woolens,	500	Cover or sink flush all projecting set-screws in collars on shafting; guard by boxing main belt in dye house; guard by secure railing crank and shaft to engine in large mill; guard by boxing shafting in dry house; guard gearing on patent dye machine; provide some suitable mechanical device whereby the elevator will be securely held in event of accident to shipper rope or hoisting machinery.	
815	Steel springs,	40	Guard by boxing shaft between rolls north end frame main factory; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
816	Silver plating,	5	Cover or sink flush projecting set-screws in collars on shafting 2d floor.	Complied.
817	Doors, blinds, etc.,	35	Remove outside water-closet to a suitable place not less than sixty feet from main factory; cover or sink flush all projecting set-screws in collars on shafting.	
818	Wood work,	5	No orders.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
819	Carriages,	17	No orders.	
820	Plush goods,	350	Provide some system for removing excessive steam generated in dyeing room; put gates at elevator openings in proper working order; thoroughly clean entire factory, and keep same as clean as the nature of the business will permit.	Complied.
821	Steam gauges,	45	No orders.	
822	Sewing machines,	1,510	Guard by boxing pulleys and belts to planers in saw room; cover or sink flush all projecting set-screws in collars on shafting.	In process
823	Corset machinery,	40	Guard by secure railing fly-wheel to motor engine; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
824	Carpets,	120	Provide some system for removing excessive steam generated in dye house; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
825	Publishing,	30	No orders.	
826	Wire works,	5	No orders.	
827	Machinery,	75	Provide hand rail to stairway leading to pattern room; cover or sink flush all projecting set-screws in collars on shafting; provide suitable stairway from 1st floor to foundry.	
828	Machinery,	5	Provide better water-closet accommodations for employees.	Complied.
829	Plumbers supplies,	12	Provide some system for the better ventilation of brass foundry; securely guard plate couplings on shafting.	Complied.
830	Printing,	4	No orders.	
831	Patterns,	5	No orders.	
832	Soap,	23	Thoroughly clean factory, and keep the same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
833	Leather belting,	12	Securely guard plate couplings on main shaft, keep door to hoistway on 3d floor closed when not in actual use; cover or sink flush all projecting set-screws.	Complied.
834	Pie bakery,	8	No orders.	
835	Paper boxes,	75	No orders.	

836	Razors,	41	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
837	Light hardware,	85	Provide better ventilation for 3d floor, main factory, by adjustable windows in roof or other suitable ventilators; thoroughly clean entire factory, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
838	Corsets,	250	Provide rails or gates to all elevator openings; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
839	Brass goods,	400	Guard elevator openings by rails or gates in wire department; securely guard plate couplings in rolling mill; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in both rouge buffing rooms.	
840	Crucibles,	33	Guard by secure railing fly-wheel to engine; cover or sink flush all projecting set-screws in collars on shafting; introduce and operate within three months from date of this order such appliances or devices as may be necessary to prevent the excessive dust in grinding room.	Complied.
841	Webbing and buckles,	125	Provide some system for the better ventilation of dip room; provide better water-closet accommodation for employees.	
842	Rubber reclaiming,	2	No orders.	
843	Emery wheels,	6	Cover or sink flush all projecting set-screws in collars on shafting; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	
844	Cartridges,	1,100	Guard by boxing shaft between buildings leading to carpenter shop; box belt running through 1st and 2d floor carpenter shop.	Complied.
845	Spoons and forks,	245	Thoroughly clean rouge buffing room, and keep same as clean as the nature of the business will permit; guard set-screw on end of shaft in polishing room.	Complied.
846	Bits and braces,	40	Guard projecting set-screw on main shaft, 1st floor; clean and disinfect water-closets, and keep same in good sanitary condition; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in polishing room.	
847	Steel chains,	40	No orders.	
848	Wire springs,	30	Thoroughly clean wire machine room in brick building, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
849	Sheet and plate iron work	20	Guard by secure railing fly-wheel and pulley to punch press main factory.	Complied.
850	Machinery,	50	Thoroughly clean entire factory, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting; clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
851	Wood boxes,	75	Put gates at all elevator openings in proper working order, and keep closed when elevator is away from same; guard gears to box printing press; box belt running through floor 2d story; cover or sink flush all projecting set-screws; enclose outside water-closet so as to protect employees from the inclemency of the weather.	Complied. In process
852	Carriages,	38	Provide better water-closet accommodation for employees; provide guard rail for doorway on 3d floor, and on stairway from 2d to 3d floor.	Complied.
853	Beer,	20	Put gates at elevator openings in proper working order.	Complied.
854	Infants Knit wear,	33	Provide rails to elevator opening 2d floor to prevent crossing over automatic doors.	Complied.
855	Paper boxes,	24	No orders.	
856	Plumbers tools,	63	Provide guard rail for doors on 2d and 3d floors, end of factory; put an adjustable window in roof of annealing room to carry off excessive heat generated therein; cover or sink flush all projecting set-screws.	Complied.
857	Wood work,	30	Guard low wheel to band saw; cover or sink flush all projecting set-screws on shafting.	Complied.
858	Steel spoons and shears,	82	Put blowers in proper working order, and keep them so at all times; thoroughly clean entire factory, and keep same as clean as the nature of the business will permit.	Complied.
859	Plating and buffing,	14	Provide better water-closet accommodations for employees; thoroughly clean factory, and keep same as clean as the nature of the business will permit.	
860	Shirts,	8	No orders.	

861	Plumbers supplies,	650	Provide ventilators for roof over machine shop; provide new cable for brass room elevator, No. 2; provide some good system for ventilating basement and iron core room; provide better water-closet accommodations for No. 1 brass room.	
862	Vehicles,	125	Securely guard plate couplings on shafting in saw room; clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
863	Plated carriage work,	49	Cover or sink flush all projecting set-screws in collars on shafting; guard by railing fly-wheel to engine.	Complied.
864	Harnesses,	35	Thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
865	Forgings,	12	No orders.	
866	Hats,	10	No orders.	
867	Plating,	5	No orders.	
868	White metal goods,	35	Introduce and operate within three months from the date of this order such appliances or devices as may be necessary to remove the excessive dust generated in buffing room.	
869	Amber goods,	8	No orders.	
870	Printing,	10	Securely cover or sink flush projecting set-screws in collars on shafting in basement.	Complied.
871	Printing,	8	Guard doorway of 2d story by placing bar across the same.	Complied.
872	Knit goods and shoddy,	185	Cover or sink flush all projecting set-screws in collars on shafting; put in new floor on platform at top of stairs, machine shop; box belting in 2d story of grist mill; guard by secure railing crank shaft of engine; keep floor clean from rubbish near circular saw.	Complied.
873	Gas and electricity,	6	Guard by secure railing fly-wheel to engine; guard elevator openings by bars or chains, and keep closed when elevator is away from same; thoroughly clean water-closet, and keep same in good sanitary condition.	Complied.
874	Envelopes,	125	Cover or sink flush all projecting set-screws in collars on shafting near engine pulley.	Complied.
875	Worsteds and cassimeres	320	Cover or sink flush all projecting set-screws in collars on main and counter shafting; box main belt in 2d weave room of new mill; provide safety catches for elevator in old mill and dye-house; provide better means of egress for females from 5th story, "L" part of old woolen mill; securely cover main belt pulley in old mill under floor near soap house.	Will comply

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
876	Worsteds and cassimeres	358	Guard elevator openings by bars or chains to prevent crossing over automatic lifts.	Complied.
877	Worsteds and cassimeres	422	Put in proper working order safety catches on elevators of dye-house and Saxony mill; provide additional water-closet accommodations, and in suitable locality, for female employees; cover or sink flush all projecting set-screws in collars on shafting; securely cover exposed gearing on gig and dye machines.	Complied.
878	Patent specialties,	3	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
879	Woolens,	40	Guard projecting bolts in couplings, near bearings; provide more than one way of egress by stairs on the inside or fire escape on outside of building from 3d to 2d story.	Complied.
880	Boards for casing,	5	Clean and keep clean floor around circular saw; provide suitable water-closet accommodations for employees.	Complied.
881	Woolens,		Not running.	
882	Wood turning,	34	Guard by secure iron railing crank of engine.	Complied.
883	Paints,	5	No orders.	
884	Metal and bone hooks,	15	No orders.	
885	Metal brackets,	7	No orders.	
886	Piano keys,	15	No orders.	
887	Piano key boards,	280	Guard elevator well on 1st floor, east end, by gates or bars, and keep closed when elevator is away from same; guard by secure railing crank to large engine; box large belt in sharp room near large saw; sink flush set-screw in collar on shaft of band saw; guard coupling on shaft in action room; box main belt in moulding room, action department; cover or sink flush all projecting set-screws in collars on shafting; flush projecting key on main shaft in cellar opposite condensers.	Complied.
888	Comb cases and wire goods,	5	Cover or sink flush all projecting set-screws in collars on shafting; guard by bars or chains all elevator openings, and keep closed when elevator is away from same; provide suitable water-closet accommodations for male employees.	

889	Piano keys,	139	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
890	Ivory combs and piano keys,	29	Cover or sink flush all projecting set-screws in collars on shafting; box main belt running from 1st to 2d story.	Complied.
891	Organ stops and knobs,	12	No orders.	
892	Wood turning and castors	10	Cover or sink flush all projecting set-screws in collars on shafting; guard coupling on main shaft in sawing room; flush projecting key on main shaft in sawing room; repair floor in sawing room; thoroughly clean and repair water-closet, and keep same in good sanitary condition.	Complied.
893	Auger and gimblet bits,	18	Guard couplings on main shaft, machine room; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in polishing room.	
894	Augers and bits,	15	Cover or sink flush all projecting set-screws in collars on shafting; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove excessive dust generated in polishing room.	
895	Wood turning,	5	No orders.	
896	Bristle brushes,	7	Box belt on lower floor at large saw.	Complied.
897	Wire goods,	12	No orders.	
898	Auger bits,	16	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in polishing room.	
899	Augers and bits,	59	Guard couplings on shaft, 2d floor; guard by secure railing crank of engine; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove excessive dust generated in polishing room.	
900	Bright wire goods,	43	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
901	Bone goods,	14	Guard couplings on main shaft, 1st floor; provide suitable and separate water-closet accommodations for male and female employees.	Complied.
902	Britannia spoons,	11	No orders.	
903	German silverware,	14	No orders.	
904	Casket hardware,	12	Box belt in old casting room; cover or sink flush projecting set-screws in collars on shafting old casting room; box main belt in machine shop; replace broken self oiler by new one in finishing room.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
905	Cotton yarn and thread,	29	Cover or sink flush all projecting set-screws in collars on shafting; guard by secure railing crank of engine; guard by keeping gates at elevator openings closed when elevator is away from same.	In process
906	Cotton seine twine,		Not running.	
907	Cotton seine twine,	32	Guard elevator openings by gates or bars, and keep closed when elevator is away from same.	
908	Seine twine,	22	Cover or sink flush all projecting set-screws in collars on shafting; guard couplings on shafting in card room; provide new rope for elevator; securely guard passageway between lapper and picker.	Complied.
909	Cotton twine,	17	Sink flush projecting set-screw on twisting machine; provide suitable and separate water-closets for male and female employees.	Complied.
910	Cotton yarn,	20	No orders.	
911	Twine and knittings,	18	Guard couplings on main shaft in card room; cover or sink flush projecting set-screws in card room.	Complied.
912	Twisting machinery,	10	Cover or sink flush all projecting set-screws in collars on shafting; guard couplings on main shaft.	Complied.
913	Twine and yarn,	20	Guard couplings on main shafting in card and spinning rooms; cover or sink flush projecting set-screws in collars on main and counter shafting.	Complied.
914	Threads and yarns,	275	No orders.	
915	Printing presses,	375	Case driving belts to dynamos in engine room; provide hand rail to walk used for oiling main shaft in blacksmith shop; change hand rail to other side, and renew steps to main stairway.	Complied.
916	Shirting and dress goods	250	Put elevator in safe condition as being used for personal conveyance; true up and balance emory wheels in machine shop.	Complied.
917	Yarn and shirtings,	58	Provide hand rail on platform near main shaft in wheel room; put bar across doorway end of slasher room; thoroughly clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
918	Yarns,	33	Guard by secure railing crank and rod to engine; provide gate to outside door in tower, 4th story; put bars across hoistway doors end of main building.	Complied.

919	Yarns,		Not running.	
920	Print goods,	55	Securely guard fly-wheel of upright engine in machine shop; provide flushing pipes to water-closets, disinfect, paint or lime wash the same; guard elevator landings by bars or chains, and keep closed when elevator is away from same.	Complied.
921	Yarns and threads,	175	Replace casing to large driving pulley in card and spooling room; provide shipper to drawing machine; sink flush set-screws in collars on doubler machines; provide suitable seats for female operatives in spooling room; thoroughly clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
922	Velvets,	42	No orders.	
923	Silk machinery,	80	Guard by bars or chains elevator openings of small elevator in foundry, and keep closed when elevator is away from same; provide hand rail to opening in floor of 2d story in foundry; cover or sink flush projecting set-screw in collar on main shaft wood working room.	Complied.
924	Cotton duck,	700	No orders.	
925	Brushes,	45	No orders.	
926	Brooms,	7	No orders.	
927	Rules and levels,	125	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
928	Cotton duck,	125	No orders.	
929	Hosiery,		Not running.	
930	Bicycles,	75	Cover or sink flush all projecting set-screws in collars on shafting; box belt running through floor 2d story.	Complied.
931	Skates, hardware, tackle and blocks,	305	Box belt on 1st floor; provide springs to elevator doors; guard by secure railing crank and shaft of engine; cover or sink flush all projecting set-screws in collars on shafting; introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust in rooms where dry grinding is done.	
932	Horse nails,	25	Guard by secure railing fly-wheel of engine.	
933	Needles,	350	Box belt on top floor.	Complied.
934	Woolen goods,	90	No orders.	
935	Machine tools,	110	No orders.	
936	Brass goods and iron castings,	178	Guard by secure railing fly-wheel and crank of engine; provide hand rail for stoop and stairway in plating room.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
937	Piano stools and tables,	30	Box belt in mill room.	Complied.
938	Iron and brass novelties,	25	No orders.	
939	Blinds and sashes,	40	No orders.	
940	Sheet brass, wires and tubing,	650	Guard pulleys on point machine; guard by secure railing engine, when completed.	In process
941	Printing,	10	No orders.	
942	Steel dies,	5	No orders.	
943	Carriage frames,	5	No orders.	
944	Wood patterns,	12	Securely guard plate couplings on shafting, 1st floor; provide better water-closet accommodations for employees.	Complied.
945	Iron ware,	8	Provide better water-closet accommodations.	Complied.
946	Wood work,	10	Guard by boxing belts to variety machine, 2d floor; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
947	Wood work,	11	Guard low driving wheel to band saw; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
948	Patent leather,	35	Thoroughly clean entire factory, and keep same as clean as the nature of the business will permit.	Complied.
949	Coach springs,	55	Remove broken pulley from shaft in spring finishing room; cover or sink flush projecting set-screws in collars on all shafting.	Complied.
950	Elastic webbing,	175	Provide better water-closet accommodation for employees of room No. 7.	Complied.
951	Carriages,	30	Provide better water-closet accommodation for employees; keep door to hoistway on 3d floor closed when not in actual use.	Complied.
952	Electric power,	5	No orders.	
953	Wood work,	10	No orders.	
954	Coach lace,	50	Guard plate couplings and projecting set-screws in collars on main shaft, 1st floor.	Complied.
955	Machinery,	4	No orders.	
956	Novelties,	23	Provide better ventilation by an additional window in roof over potash and hot water kettles.	Complied.

957	Machinery,	25	Guard by secure railing fly-wheel of engine; securely brace up 2d floor by not less than from 6 x 8 timbers.	In process
958	Wheels,	45	Guard plate couplings on main shaft, 1st floor; cover or sink flush all projecting set-screws in collars on shafting; guard elevator openings by gates or bars, and keep closed when elevator is away from same.	Complied.
959	Varnishes,	5	No orders.	
960	Beer,	12	No orders.	
961	Brass goods,	25	Guard by secure railing fly-wheel of engine; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
962	Grain elevator,	12	Guard by secure railing balance and cog wheels of engine; guard by boxing belt running through floors of 1st and 2d story.	
963	Brass goods,	21	Put blower in buffing room in proper working order to remove the excessive dust.	
964	Automatic grinding machinery,	20	Provide better water-closet accommodations for employees.	Complied.
965	Boiler and water valves,	16	Provide better water-closet accommodations for employees.	Complied.
966	Steel metal goods,	30	Provide better water-closet accommodations for male employees.	Complied.
967	Furniture trimmings,	156	Guard by boxing low shafting in buffing room; remove set-screw in collar on counter shaft in turning barrel room; provide some system for removing the excessive flumes of laquer in buffing room.	Complied.
968	Hardware,	75	Thoroughly clean buffing and polishing room, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting; guard gear to slotting machine in basement.	Complied.
969	Machinery,	125	Guard low pulley to band saw; guard by railing stairway from 1st to 2d story erecting department, cover or sink flush projecting set-screws on shaft in saw room; guard elevator opening in basement to prevent passage under same.	
970	Toys,	36	No orders.	
971	Brass valves,	100	Guard by boxing shaft to grinding lathes, 1st floor; provide better ventilation in core room by placing adjustable windows in roof.	Complied.
972	Rubber goods,	27	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
973	Rubber goods,	53	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
974	Corsets,	650	Provide not less than two 24 inch ventilators for roof steel shop over 2d floor; provide some system for removing excessive smoke generated in japaning department; cover or sink flush all projecting set-screws in collars on shafting.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
975	Deoxidized metal,	30	Thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
976	Bronzed metal,	20	No orders.	
977	Hardware,	178	Thoroughly clean rouge buffing rooms, and keep same as clean as the nature of the business will permit; provide better light and ventilation in rolling mill 6 and 7; cover or sink flush all projecting set-screws in collars on main and counter shafting.	Complied.
978	Machinery,	10	No orders.	
979	Embroidered flannels,	30	No orders.	
980	Organs,	75	Guard by secure railing fly-wheel of engine; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
981	Corsets,	106	No orders.	
982	Silver plated ware,	50	Thoroughly clean entire factory, and keep same as clean as the nature of the business will permit; provide some system for removing the excessive fumes of lacquer generated in factory.	
983	Graphophones,	38	No orders.	
984	Silk cloth,	140	Guard gears to silk looms in weave room; cover or sink flush projecting set-screws in collars on shafting.	Complied.
985	Piano and organ hardware,	55	No orders.	
986	Machinery,	19	Cover or sink flush all projecting set-screws in collars on shafting; provide separate water-closet accommodation for female employees.	In process
987	Electric specialties,	75	No orders.	
989	Varnishes,	8	No orders.	
990	Vehicles,	6	Thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.
991	Card paper,	15	No orders.	
992	Writing machines,	154	Provide hangers for press belt to catch belt when thrown from pulley; provide a better system of guards to elevator openings; cover or sink flush all projecting set-screws in collars on shafting.	Complied.

993	Monuments,	40	Cover or sink flush projecting set-screw in collar on main shaft; guard by secure railing fly-wheel and main belt to engine.	Complied.
994	Hot rolling mill,	75	No orders.	
995	Copper refining,	300	Have fly-wheel of Westinghouse engine securely guarded.	Complied.
996	Forgings,	100	Thoroughly clean factory, and keep same as clean as the nature of the business will permit; provide better light in forging department by a thorough washing of all windows, and by additional windows in roof.	Complied.
997	Silver plated notions,	150	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove excessive dust in finishing room; cover or sink flush all projecting set-screws in collars on shafting; repair flooring near finishing room; put fan in casting room in proper working order; provide more than one way of egress from 3d to 2d story by stairs on the inside or fire escape on outside of building.	In process
998	Hats,	125	Guard driving belt to forming machine; cover or sink flush all projecting set-screws in collars on shafting; sink flush projecting set-screw on low shafting of blower machine; put in proper working order fan in makers room; provide some system for better ventilation in finishing room; provide lights for stairways, and keep same lighted up; thoroughly clean water-closets for male employees.	
999	Hats,	130	Guard by boxing belt running through floor at blowing machine; provide some system for better ventilation in finishing room; repair stairs leading to drying room, and provide railing at the landing of same; thoroughly clean water-closet, and have same cleaned at least twice a week, repair and put in suitable condition seats of same; cover or sink flush all projecting set-screws in collars on shafting; provide lights for stairway from finishing room to 1st floor, and keep same lighted up.	
1000	Hats,	220	Guard belt of forming machine; guard main belt at passageway near engine room; provide lights for stairways, and keep same lighted; provide some system for the better ventilation of blowing room; provide belt for fan in finishing room, provide more openings in exhaust pipe, and keep fan in operation.	Complied.
1001	Hats,	150	Cover or sink flush all projecting set-screws in collars on shafting; provide some system for better ventilation in finishing room; provide hand rail to stairway from finishing room to 2d floor.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1002	Hatters tools and machinery,	14	No orders.	
1003	Hats,	300	Guard by boxing cross belts in forming room; relay flooring in sizing room in a way for easy drainage, or bore holes in flooring no less than one inch in diameter to drain off the water; provide suitable water-closet accommodations for employees of sizing and makers department, and have same thoroughly cleaned and flushed at least three times a week.	
1004	Hats,	50	Guard by casing or railing opening in floor of drying room; provide hand railing to stairway in drying room.	
1005	Hats,	250	Guard by cross bar doorway of blowing room; guard by bars or chains elevator opening in curling room, and keep closed when elevator is away from same.	Complied.
1006	Paper box and hat casings	100	Cover or sink flush all projecting set-screws in collars on shafting; cover hole in floor of hatch near cutting room.	Complied.
1007	Blinds, doors and sashes,	40	Cover or sink flush all projecting set-screws in collars on shafting; guard by boxing driving pulley and belt to moulding machine; guard by bridging main driving belt to wood saw, flooring, and planing machines; box driving belt and pulley of flooring machine; remove excessive litter and rubbish and keep rooms in clean condition.	Complied.
1008	Paper cutters and wool dusters,	4	No orders.	
1009	Gas and electricity,	6	Securely guard all driving belts to dynamo engines by iron standards same as one in use at time of inspection.	Complied.
1010	Dress goods and flannels,	150	Box driving pulley and belt to grinding machine in card room; provide new cable for elevator, and keep gates closed when elevator is away from them.	Complied.
1011	Fine carriage goods,	100	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
1012	Broad cloth,	115	No orders.	

1013	Guernsey strips and tickings,	500	No orders.	
1014	Ladies dress goods and flannels,	41	Provide hand rail to stairs out of finishing room; box driving pulley and belt to drying machine; box main driving belt in jack room.	Complied.
1015	Ladies cloths and cassimeres,	94	No orders.	
1016	Table cutlery,	82	Provide shippers to rolling machines, sink flush projecting set-screws and keys on same machines; provide hand rail to stairs on raised platform at main shaft in forge room; furnish or replace piping hoods to all emery wheels in finishing room, and operate blower connected therewith so that the excessive dust in said room shall be removed.	Complied.
1017	Printing,	31	No orders.	
1018	Ribbons and hat bands,	50	Thoroughly clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
1019	Ribbons and hat bands,	75	No orders.	
1020	Brass goods,	21	Provide better water-closet accommodations for employees.	Complied.
1021	Denims,	200	Guard by hand rail each side of main shaft and driving pulley, power room; guard crank and rod of main engine, place hand rail at opening near stairs, calendar room; guard by iron rails crank rod and fly-wheel of main and dynamo engines, furnishing power to light weave shed; box main belt same place, and provide hand rail to stairway same room.	Complied.
1022	Print goods,	140	No orders.	
1023	Paper,	34	Box gears to agitator machine; place hand rail around platform in wheel room.	Complied.
1024	Paper,	155	Box main belt driving wet machine, securely guard large driving pulley to same; provide new trap door to elevator, 2d story; box main belt at doorway passage, 2d floor; provide new cable to elevator; provide iron rails to raised platform to Calendar machines; replace box to main belt in stock room.	
1025	Cotton prints,	450	Cover or sink flush all projecting set-screws in collars on counter shafting; provide safety catches to securely hold elevator in event of accident to cable or hoisting machinery; sink flush all projecting set-screws on drying machine.	Complied.
1026	Denims and bed ticking,	560	Box main belt to counter shaft in beaming room; provide chain guard to elevator opening; securely guard by iron railing, two bars high, crank and rods to main engines.	Complied.

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1027	Steam heaters,	3	No orders.	
1028	Gas,	8	No orders.	
1029	R. R. repairing,	45	No orders.	
1030	Braid and picture cord,	31	Guard by iron rails balance wheel to engine; cover or sink flush all projecting set-screws in collars on shafting.	
1031	Boilers and heaters,	70	No orders.	
1032	Laundering,	11	Guard by iron rails fly-wheel and belt to engine; case driving belt running through floor 3d story.	Complied.
1033	Bed comforts,	87	No orders.	
1034	Cotton twills,	120	Guard by boxing or rails driving pulley and belt furnishing power to spinning and card rooms; all gates to elevator openings to be kept closed when elevator is away from same.	Complied.
1035	Wood work,	10	Guard by suitable railing stairway from 1st floor to wood loft; cover or sink flush all projecting set-screws in collars on shafting; guard by railing fly-wheel to engine.	Complied.
1036	Arc lights,	6	Guard by secure railing driving belts to dynamos in arc light house.	
1037	Cornices,	12	No orders.	
1038	Rag shop,	12	No orders.	
1039	Mattresses,	5	No orders.	
1040	Corsets,	62	No orders.	
1041	Corsets and waists,	76	Provide more than one way of egress from 4th floor by additional stairway on the inside or fire escape on the outside.	
1042	Malleable iron castings,	400	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to remove the excessive dust generated in core room, and in room used for tumbling barrels and grinding; guard pulley and belts to blower near engine room; cover or sink flush all projecting set-screws in collars on shafting; thoroughly clean entire works, and keep same as clean as the nature of the business will permit.	

1043	Light hardware,	40	Guard by gates or bars all elevator openings, and keep closed when elevator is away from same; provide hangers for belts to keep same from running on shafting when not in use; cover or sink flush all projecting set screws in collars on shafting.	
1044	Corsets,	1,600	Provide gates to all elevator openings and keep same in proper working order; guard shaft to gang machine 2d floor building "C"; cover or sink flush all projecting set-screws in collars on shafting.	
1045	Light hardware,	60	Provide hangers for press belts, 1st floor; provide guard rail for stairway from 2d floor to attic.	Complied.
1046	Machinery,	35	Provide at least two ventilators for roof of machine shop.	
1047	Car couplings,	6	No orders.	
1048	Iron castings,	65	Thoroughly clean entire works, and keep same as clean as the nature of the business will permit; cover or sink flush all projecting set-screws in collars on shafting; thoroughly clean and disinfect outside water-closet.	Complied.
1049	Light brass goods,	8	No orders.	
1050	Printing,	5	Guard by boxing low pulley to printing press.	Complied.
1051	Machine shop,	4	No orders.	
1052	Printing,	25	Cover or sink flush all projecting set-screws in collars on shafting.	
1053	Printing,	30	No orders.	
1054	Shirts,	400	Guard by secure railing fly-wheel to engine; provide some system for the better ventilation of flannel stitching room.	
1055	Dress stays,	185	Guard by secure railing both fly and balance wheels to engine; guard pulley and belt to seaming machine table; provide hangers for press belts; cover or sink flush all projecting set-screws.	Complied.
1056	Book binding,	5	No orders.	
1057	Bronze castings,	12	No orders.	
1058	Pianos,	30	Guard by boxing pulleys and shaft to variety moulding machine; cover or sink flush all projecting set-screws.	Complied.
1059	Laundering,	100	No orders.	
1060	Laundering,	10	Guard driving wheel and belt to engine; guard set-screws in coupling and in collars on main shaft.	Complied.
1061	Wood work,	8	Guard by boxing low pulley to band saw.	Complied.
1062	Packing house,	40	Cover or sink flush all projecting set-screws in collars on shafting.	
1063	Bologna,	8	No orders.	
1064	Cloaks,	24	Thoroughly clean factory, and keep same as clean as the nature of the business will permit.	Complied.

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1065	Rag shop,	20	No orders.	
1066	Carriage springs,	40	No orders.	
1067	Silk yarns,	93	Provide new cable to elevator; securely guard elevator landings by gates, bars, or chains, and keep closed when elevator is away from same; securely guard fly-wheel of main engine by casing pit; box driving belt on counter shaft near water-closet door; cover or sink flush all projecting set-screws in collars on shafting; thoroughly clean and disinfect female water-closet, 2d floor, and provide suitable ventilation for the same.	
1068	Cheviots and shirting,	500	No orders.	
1069	Fine yarns,	22	Cover or sink flush projecting set-screw in collar on counter shaft.	Complied.
1070	Cambrics, satines twills and yarns,	250	Provide new hand rail to gears on crank shafts to looms in No. 2 mill; guard by hand rail opening near passageway from weave room to No. 1 mill; thoroughly disinfect by lime washing water-closets in No. 2 mill, and keep same in better sanitary condition.	Complied.
1071	Bleaching, dyeing and finishing,	112	Guard by boxing driving pulleys and belt to Calendar machines, case or box all large belts running through floors; securely guard main driving pulleys and belts and pit to same, by casing or rails; guard balance wheels to four small engines furnishing power to machines by casing or rails; keep elevator doors and gates closed when elevator is away from same.	Complied.
1072	Laundering,	9	Guard by iron or wood railing fly-wheel and crank to engine.	Complied.
1073	Cassimeres,	140	Box driving pulleys and belts to looms facing passageways; guard by casing main belt running through floor spinning room; guard by bridging main belt running overhead card room; replace casing to upright shaft wheel room; cover or sink flush all projecting set-screws in collars on shafting.	Complied.

1074	Coarse yarns,	23	Guard by casing upright shaft in wash and wheel room; cover or sink flush all projecting set-screws in collars on shafting; guard by secure railing fly-wheel to engine; thoroughly clean and disinfect water-closets, and keep same in good sanitary condition; provide some system for the better ventilation of picker room.	Complied.
1075	Paper,	7	Box main belt driving agitator machine; guard by iron railing fly-wheel of engine; provide hand rails to steps near large gears on agitator machine.	Complied.
1076	Paper,	15	No orders.	
1077	Paper,	10	Guard by iron rails, two bars high, driving pulley and belts furnishing power to rag boiler; guard fly-wheel and driving pulley to engine driving agitator machine.	Complied.
1078	Bed comfortables,	127	No orders.	
1079	Cassimeres,	75	Guard by casing driving belt in card room; guard fly-wheel to engine by secure iron railing, box main belt to same; provide hand rail to outside stairs; clean, disinfect, and lime wash male water-closets.	
1080	Dress goods and fine printing cloth,	1,800	Guard by iron rail crank and fly-wheel to engine, wood working room.	Complied.
1081	Sheetings, lawns and linens,	160	Provide hand rail to stairs leading to boiler room; replace iron top rail to gears on crank shaft of looms, wherever broken by new ones; thoroughly clean, disinfect, and lime wash all water-closets, and provide suitable and proper accommodations for same; provide hand rail to stairs leading from carding to spooling room; replace door to elevator landing.	
1082	Bars, bolts and spike rods	42	Securely guard by replacing iron rails at fly-wheel main driving pulleys and belts; securely guard all large gears by rails or boxing.	Complied.
1083	Woolen goods,	36	No orders.	
1084	Stoves, ranges and hot air furnaces,	160	Guard small elevator landing by chains; cover or sink flush projecting set-screws in collars on counter shafting; furnish better and suitable ventilation in foundry and wire rooms.	In process
1085	Fire arms,	375	Cover or sink flush projecting set-screws in collars on counter shaft in stock room; also those on shafting in room occupied by the Norwich Nickel & Brass Works.	
1086	Fixtures,	30	No orders.	
1087	Paper machinery,	20	No orders.	

REPORT OF INSPECTIONS—CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1088	Cotton goods,	54	Repair trap door to hoistway, and put in safe condition, repair weak places in floor near same; clean and disinfect all water-closets, and lime wash ceilings of same.	Complied.
1089	Cotton sheeting,	50	Clean and disinfect water-closets.	Complied.
1090	Cotton goods,	154	Guard by boxing driving gears to looms near door passageway to weave room; guard by iron rails upright engine near slasher machine; guard by gates, bars, or chains elevator landings; box driving pulley and belt to saw machine, machine shop.	
1091	Thread yarns,	100	Guard regulator by secure rail; guard elevator landing by bar or chains; sink flush projecting set-screw in collar on doubler machine; cover or sink flush projecting set-screw in collar on main shaft in speeder and card room, case driving belt running through floor same room; provide new cable to elevator.	
1092	Worsted and fancy cassimeres,	223	Guard fly-wheel, crank and rod of main engine by iron railing; make water-closet in gig room suitable by replacing old wood work with new; and disinfect said closet by lime washing same; guard elevator openings of elevator from wash to gig room by gates; guard regulator by iron railing; box main driving belts.	
1093	Worsted yarns,	107	Securely guard main driving pulleys and belts in pit, by casing around said pit.	
1094	Brass castings,	9	No orders.	
1095	Patterns,	5	No orders.	
1096	Rubber goods,	50	Guard elevator opening on 2d floor by gate, rail or chains, and keep closed when elevator is away from same; cover or sink flush all projecting set-screws; guard gears to rubber roller, 1st floor, north end of roller machine room.	
1097	Sail cloth and twine,	15	Sink flush set-screw at the end of 3d spinning frame, from north end.	Complied.
1098	Sail cloth,	26	Guard by gates or bars elevator landing on 3d floor, and keep closed when elevator is away from same.	

1099	Cotton seines, netting and twine,	40	Guard coupling on main shaft between driving pulley of twisting room and boxed pulley run by water wheel shaft; box driving belt of lapper in machine shop.	
1100	Agricultural implements	100	Cover or sink flush all projecting set-screws in collars on shafting in grinding room and machine shop; guard all flange couplings; thoroughly clean and disinfect water-closets, and keep same in good sanitary condition.	Complied.
1101	Cotton yarns,	65	Cover or sink flush all projecting set-screws in collars on shafting in card room; thoroughly clean and disinfect water-closets, and keep same in good sanitary condition.	
1102	Planters hoes,	50	No orders.	
1103	Witch hazel,	6	No orders.	
1104	Cash boxes,	28	No orders.	
1105	Planters hoes,	18	Repair and thoroughly clean and disinfect water-closet, and keep same in good sanitary condition.	
1106	Planters hoes,	15	Provide suitable water-closet accommodation for employees.	
1107	Planters hoes,	23	Box main driving pulley and cross belts in polishing room; repair and thoroughly clean water-closet, and keep same in good sanitary condition.	
1108	Cotton webbing,	108	Cover or sink flush all projecting set-screws in collars on shafting; guard couplings on main shaft in calender room.	
1109	Belting and webbing,	250	Box cross belts in cycle web room near small engine; cover or sink flush all projecting set-screws in collars on shafting of lustre room and machine shop; guard all flange couplings.	
1110	Elastic webbing,	150	Cover or sink flush all projecting set-screws in collars on shafting.	
1111	Silk winding and warping	175	No orders.	
1112	Silk floss and thread,	150	No orders.	
1113	Harness hardware,	39	No orders.	
1114	Rubber goods,	60	No orders.	
1115	Padlocks and harness hardware,	95	Introduce and operate within three months from date of this order such appliances or devices as may be necessary to take off excessive dust generated in polishing room; repair and thoroughly clean and disinfect male water-closets, and keep same in good sanitary condition; guard flange couplings on shaft furnishing power to binding machine, machine shop.	

REPORT OF INSPECTIONS — CONTINUED.

Number.	Goods Manufactured.	No. of Employees.	Orders Given.	Compliances.
1116	Gun sights,	25	No orders.	
1117	Soap,	12	Guard by secure railing fly-wheel of engine.	
1118	Grinding oats, corn and cereals,	6	Cover or sink flush all projecting set-screws in collars on shafting.	Complied.
1119	Wood turning,	10	Guard driving pulley and belt furnishing power to 2d floor; box driving belt 2d floor; cover or sink flush all projecting set-screws in collars on all shafting.	
1120	Padlocks,	50	No orders.	
1121	Pumps,	177	Cover or sink flush all projecting set-screws in collars on shafting in blacksmith shop and pipe room, guard couplings on same shafting.	
1122	Electric apparatus,	600	Cover or sink flush projecting set-screw in collar on main shaft 1st floor.	Complied.
1123	Silver plated goods,	162	Cover or sink flush projecting set-screw in collar on shaft furnishing power to grind stone.	Complied.
1124	Rubber boots and shoes,	180	Cover or sink flush all projecting set-screws in collars on shafting in heel pressing room.	
1125	Woolen blankets,	53	Box main belt in spinning room; guard flange couplings in finishing room; cover or sink flush all projecting set-screws in collars on shafting.	Complied.
1126	Bone and ivory goods,	45	Cover or sink flush all projecting set-screws in collars on shafting.	
1127	Cotton yarns,	52	Cover or sink flush projecting set-screws in collars on shafting driving railway head; securely guard flange couplings on shaft driving railway head, also on shafting of lapper and pump rooms.	
1128	Revolvers and hardware,	100	Securely guard all flange couplings on main shafting; provide more than one way of egress from 3d to 2d floor by stairs on the inside or fire escape on outside of building; repair and thoroughly clean water-closet, and keep same in good sanitary condition.	
1129	Elastic webb and belting,	96	No orders.	
1130	Hammock and cotton goods,	150	No orders.	

1131	Metal bells,	37	Securely guard flange couplings on shafting in finishing room; box belt running through floor of finishing room; provide suitable water-closet accommodation for male employees.	
1132	Metal bells,	81	Make shafting secure in buffing room; securely guard large press in packing room; guard by secure railing driving wheel to engine.	
1133	Cotton and silk threads,	125	Guard by secure railing crank and driving wheel of engine.	
1134	Casting and turning bells	30	Cover or sink flush all projecting set-screws in collars on shafting.	
1135	Metal bells,	30	Securely guard all flange couplings on main shaft in turning room; cover or sink flush all projecting set-screws in collars on shafting same room.	
1136	Metal bells and toys,	12	No orders.	
1137	Metal bells and toys,	38	Securely fasten all presses to floor by bolts; introduce some system for the better ventilation of buffing room.	
1138	Wood work,	5	No orders.	
1139	Paper boxes,	11	No orders.	
1140	Machinery,	12	No orders.	
1141	Engine governors,	47	No orders.	
1142	Sheet iron and tinware,	215	Guard by secure railing crank of engine; repair and thoroughly clean male water-closets.	Complied.
1143	Stone quarrying,	125	Guard by secure railing crank and driving wheel to engine.	
1144	Sawing and turning stone	40	No orders.	
1145	Quarrying stone,	150	No orders.	
1146	Hardware,	175	Securely guard flange couplings on shafting of machine shop and grinding room; cover or sink flush all projecting set-screws in collars on shafting in same rooms.	
1147	Iron specialties,	6	Guard flange couplings on main shaft.	
1148	Files,	8	No orders.	
1149	Bone goods,	70	Guard by secure railing crank of engine.	
1150	Hardware and toys,	107	Cover or sink flush all projecting set-screws in collars on shafting in east building and dynamo room; guard couplings on same shafting; box large belts running through floors same building; true up and fasten shaft in engine room; introduce some system for the better ventilation of polishing room.	
1151	Hammers,	5	No orders.	
1152	Quarrying stone,	150	Guard by secure railing fly-wheel to engine furnishing power to hoisting machines.	
1153	Sawing and cutting stone	25	No orders.	
1154	Quarrying stone,	50	No orders.	

LAWS

RELATING TO

FACTORIES AND FACTORY INSPECTOR.

[General Statutes.]

CHAPTER CXLV.

SECTION 2263. The governor shall, with the consent of the senate, within sixty days after the organization of the general assembly in January, 1889, and every two years thereafter, appoint an inspector of factories, who shall hold his office from the first day of the succeeding July for a term of two years, and until his successor is appointed and qualified. In case of vacancy in the office of inspector through death, resignation, inability, or removal, the governor shall fill the same until filled in the manner above provided for the appointment of inspector; and the governor may remove the inspector for cause.

SEC. 2264. The inspector of factories shall, as often as practicable, carefully examine all buildings and places where machinery shall be used, and shall have authority to enter such buildings and places at all proper times for the purposes of such inspection. He shall, on or before the first day of December in each year, make a report to the governor of the condition, as respects safety to life and health, of the factories, buildings, and places visited by him, and such report shall be printed for the use of the general assembly at each of its regular sessions.

SEC. 2265. All factories and buildings where machinery shall be used shall be well ventilated, and kept as clean as the nature of the business will permit. The belting, shafting, gearing, machinery, and drums of all factories and buildings where machinery shall be used, when so placed as, in the opinion of the inspector, to be dangerous to persons employed therein while engaged in their ordinary duties, shall as far as practicable, be securely guarded. No machinery other

than steam engines in a factory shall be cleaned while running, after notice forbidding the same is given by the inspector to the owners or operators of the factory.

SEC. 2266. The inspector may order the opening of all hoistways, hatchways, elevator wells, and wheel-holes upon every floor of any factory or other building where machinery shall be used to be protected by good trap-doors, self-closing hatches, and safety-catches, or other safeguards such as will insure the safety of the employees in such factory or other building where machinery shall be used, and all due diligence shall be used to keep such trap-doors closed at all times, except when in actual use by an occupant of the building having the use and control of the same.

[Amended by Chap. CXVIII Public Acts, 1893. See page 101.]

SEC. 2267. Every person or corporation managing or operating any factory, or owning or controlling the use of any other building where more than five persons shall be employed at labor, shall provide suitable water-closet accommodations for the use of the persons employed, and shall keep the same in good sanitary condition.

SEC. 2268. It shall be the duty of the inspector to enforce the provisions of this chapter by giving proper orders or notices to the persons or corporations owning, operating, or managing, the factories or buildings inspected by him, and also to make complaint to the state's attorneys in the several counties respectively of all violations of this chapter.

SEC. 2269. Any person, firm, or corporation being the owner, lessee, or occupant of any factory or building included within the provisions of this chapter, or owning or controlling the use of any room in such building, shall, for the violation of any provision of sections 2265, 2266, or 2267, forfeit to the use of the state not less than fifty nor more than five hundred dollars, and shall also be liable to any employee for all damages suffered by him by reason of such violation. It shall be the duty of the state's attorneys in the several counties to collect forfeitures under this chapter, but no suit shall be brought for any such violation, either in behalf of any person or the state, until four weeks after notice has been given by the inspector to such person, firm, or corporation of any changes necessary to be made to comply with the provisions of said sections, and not then, if, in the meantime, such changes have been made in accordance with such notification. Nothing herein shall be construed as limiting in

any way the right of a person injured to bring an action to recover damages for the same as though this chapter had not been enacted.

[Amended by Chapter CCXXV, Public Acts, 1889. See next page.]

SEC. 2270. The orders and notices given by the inspector under this chapter shall be written or printed, and signed by him officially, and may be served by himself or any proper officer or indifferent person, by leaving an attested copy thereof with or at the usual place of abode of the person upon whom service is to be made; and the notice, properly indorsed with the doings of the person or officer serving the same, shall be returned to the office of the town clerk of the town in which is located the factory, building, or business to which such notice appertains, where it shall be kept on file. Such notice, and copies thereof duly certified by the town clerk, shall be *prima facie* evidence that notice was given as therein appears. Notice to one member of a firm shall be notice to every member thereof, and notice to the president, secretary, or treasurer of a corporation shall be notice to such corporation. The fees for serving such orders and notices, unless served by the inspector, shall be the same as for the service of process in civil actions, and shall be included in the necessary expenses of the inspector and paid by the state.

SEC. 2271. It shall be the duty of the comptroller to provide suitable rooms in the capitol at Hartford for the use of the inspector, and to furnish him blank forms for the purpose of giving the notices and orders required by this chapter, and for annual reports to be made to the governor. The inspector shall keep, in books provided by the comptroller for that purpose, copies of all notices and orders given by him, and a record of all inspections and examinations made, and upon the expiration of his term of office shall file his books of record with the secretary of the state.

SEC. 2272. The inspector may from time to time employ special agents to assist him in his inspections and examinations, who shall receive compensation for the time actually employed in such service only. The total amount expended under this section shall not exceed in any one year the sum of fifteen hundred dollars, which shall be paid by the state upon proper vouchers by the special agents, which shall be signed by the inspector.

[Amended by Chapter CCVI, Public Acts, 1893. See page 103.]

[Public Acts of 1889.]

CHAPTER CLXXIII.

An Act concerning Printing of Reports of the Inspector of Factories.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. The Comptroller shall annually cause to be printed, at the expense of the State, five thousand copies of the report of the Inspector of Factories.

SEC. 2. This act shall take effect upon its passage.

Approved June 4, 1889.

[Public Acts of 1889.]

CHAPTER CCXXV.

An Act relating to Factories.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 2269 of the general statutes is hereby amended by inserting between the words "sections" and the figures "2265" in the fifth line thereof, the figures "2264," so that the first sentence of said section as amended shall read as follows: Any person, firm, or corporation being the owner, lessee, or occupant of any factory or building included within the provisions of this chapter, or owning or controlling the use of any room in such building, shall, for a violation of any provisions of sections 2264, 2265, 2266, 2267, forfeit to the use of the State not less than fifty nor more than five hundred dollars, and shall also be liable to any employe for all damages suffered by him by reason of such violation.

Approved June 19, 1889.

[Public Acts of 1893.]

CHAPTER LIX.

An Act concerning the Employment of Custodians of Elevators.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. No person, partnership, or corporation, shall permit or employ any person under the age of sixteen years to have the care, custody, operation, or management of any elevator.

SEC. 2. Any person, partnership, or corporation violating the provisions of this act shall be punished by a fine of not less than five dollars nor more than twenty-five dollars for each offense.

Aproved April 19, 1893.

[Public Acts of 1893.]

CHAPTER LXXVII.

An Act concerning Seats for Female Operatives.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. Every person. partnership, or corporation employing females, in any mercantile, mechanical or manufacturing establishment in this State, shall furnish and provide suitable seats for the use of all females so employed, and shall permit the use of such seats by said females when they are not necessarily engaged in the active duties for which they are employed.

SEC. 2. Any person, partnership, or corporation violating any of the provisions of this act shall be punished by a fine not less than five dollars nor more than fifty dollars for each and every offense.

Approved April 25, 1893.

[Public Acts of 1893.]

CHAPTER CXVIII.

An Act concerning Elevators.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 2266 of the general statutes is hereby amended to read as follows: The Inspector of Factories may order the opening of all hoistways, hatchways, elevator wells, and well holes, upon every floor of every factory, mercantile establishment, or other building where machinery shall be used, to be protected by good trap doors, self-closing hatches, and safety catches or other safeguards, such as will ensure the safety of the employees in such factory, mercantile establishment, or other building where machinery shall be used, and all due diligence shall be used to keep such trap doors closed at all times, except when in actual use by an occupant of the building having the use and control of the same. All elevator cabs or cars, whether used for freight or passengers, shall be provided with some

suitable mechanical device, if considered necessary by the said inspector, whereby the cab or car will be securely held in the event of accident to the shipper-rope or hoisting machinery, or from any similar cause, and said mechanical device shall at all times be kept in good working order.

Approved May 18, 1893.

[Public Acts of 1893.]

CHAPTER CCIV.

An Act for the Preservation of the Health of Factory Employes.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. Whenever the Inspector of Factories, on complaint of any person, after due investigation, shall find it necessary for the preservation of the health of the employes in any manufacturing establishment, factory, or mill in which is carried on the business of buffing, polishing, or grinding metal, or any operations in which an excessive amount of dust is generated, that the excessive dust resulting from said operations should be removed from the atmosphere of the rooms or apartments used for that purpose, he shall, in writing, direct the person or persons or corporation owning or occupying said premises, or carrying on business in such premises, within three months from the date of said order, to introduce and operate such appliances or devices as may be necessary to remove, so far as the nature of the business will permit, such excessive dust or foreign matter from the atmosphere of such mill, factory or apartment used for the purposes aforesaid; *provided*, such appliances or devices do not restrict or interfere with the aforesaid business or operations.

SEC. 2. Any violation of any proper order made or given by the inspector of factories, under the provisions of the preceding section, shall be punished in the manner provided in section 2269 of the general statutes.

Approved June 14, 1893.

[Public Acts of 1893.]

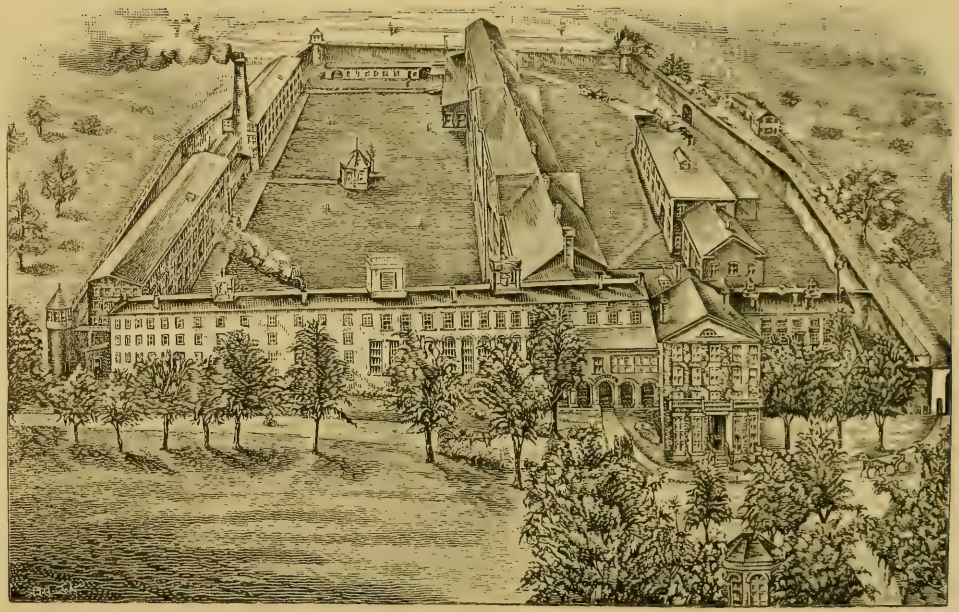
CHAPTER CCVI.

An Act relating to Duties of the Inspector of Factories.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 2272 of the general statutes is hereby amended to read as follows: The inspector may from time to time employ special agents to assist him in the performance of the duties of his office. Such special agents while so employed shall have the same power and authority as the inspector, subject to his approval. The total amount expended under this section shall not exceed in any one year the sum of three thousand dollars, which shall be paid in the same manner as the expenses of other departments of the state government, upon proper vouchers by the special agents, signed by the inspector.

Approved June 14, 1893.



CONNECTICUT STATE PRISON.

PEN AND INK SKETCH BY A CONVICT,
APRIL, 1894.

REPORT

OF

THE DIRECTORS

OF THE

CONNECTICUT STATE PRISON,

TO

THE GENERAL ASSEMBLY,

January Session, 1895.

Printed by Order of the Legislature.

HARTFORD, CONN.:
PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.
1894.

ROSTER OF OFFICERS

OF THE

CONNECTICUT STATE PRISON.

DIRECTORS.

CHARLES F. BOLLMANN, *President*,	New Haven.
EDWARD M. CHAPIN, *Secretary*,	Pine Meadow.
FRANK C. SUMNER,	Hartford.
MICHAEL W. LAWTON,	Middletown.
FREDERICK A. SPENCER,	Waterbury.
JOHN N. CHITTENDEN,	Madison.
MARVIN H. SANFORD,	Simsbury.

WARDEN.

JABEZ L. WOODBRIDGE, Hartford.

DEPUTY WARDEN.

GEORGE E. BAISDEN, Rocky Hill.

CLERK.

H. KIRK WOODBRIDGE, Hartford.

CHAPLAIN.

DIGHTON MOSES, Granby.

PHYSICIAN.

EDWARD G. FOX, Wethersfield.

STEWARD.

LUCIEN M. HORTON, Hartford.

HALL-KEEPER.

T. CHARLES TREDEAU, Hartford.

GATE-KEEPER.

HENRY G. RISLEY, Windsor.

DAY GUARD ROOM OFFICER.

DAVID R. BOGUE, Columbia.

OVERSEERS OF CONTRACT SHOPS.

William B. DeBlois, Wethersfield.
John S. Doolittle, Hartford.
James E. Officer, Hartford.
Henry Holmes, Wethersfield.
William E. Officer, Hartford.
Albert Perkins, Westville.

OVERSEER OF MEN'S LAUNDRY AND STATE SHOP.

Thomas W. Jones, Seymour.

ENGINEER.

Eli W. Giddings, Canaan.

FARMER.

Robert L. Fulton, Wethersfield.

FRONT GUARD OFFICER.

Luke Merrick, New Hartford.

HALL WATCHMEN.

Albert Adams, Wethersfield.
James C. Hughes, Hartford.
Daniel F. Murphy, Rockville.
Thomas L. Chatfield, Canada.
George F. Smith, Hartford.
Frederick Knight, Middletown.
John F. Reilly, Hartford.
Alvin S. Hull, New Haven.
Frederick J. Coudray, Wethersfield.
Francis Reed, Hartford.

WALL WATCHMEN.

William H. Mildrum, Wethersfield.
Elbert A. Fuller, Andover.
John F. Lehr, Hartford.

NIGHT GUARD ROOM OFFICER.

Patrick J. Ahern, South Manchester.

NIGHT WATCHMEN.

Ralph F. Hills, Wethersfield.
Emerson D. Babcock, Wethersfield.

MATRON.

Elizabeth M. Cusick, Hartford.

REPORT OF THE DIRECTORS.

To His Excellency, LUZON B. MORRIS, Governor of Connecticut.

SIR:—

The directors of State Prison herewith respectfully present their annual report, added to which will be found a very complete report concerning the Prison made to us by the Warden, and also the reports of the Chaplain and of the Physician of that institution.

During the time herein covered, namely, from July 1, 1893, to October 1, 1894, your directors held twenty meetings. These took place at the Prison and were, with very few exceptions, attended by every director. When our official duties commenced, the condition of the affairs of the institution intrusted to our care was a most peculiar one. As the General Assembly of 1891 had made no appointments, the terms of all our immediate predecessors had expired at the same time, viz., July 1, 1893; none of the latter had been reappointed, and hence the official term of every present director commenced on the last-named date. We had to begin without that valuable information and assistance which new members of State Boards generally receive from their holding-over colleagues. Furthermore, the General Assembly of 1893 had ordered a thorough investigation by some of its members into the management of the Prison, the result of which is yet well remembered; pending that investigation, the Warden, the Chaplain and the Physician had been suspended from duty, and Brig.-General George Haven, C. N. G., had been placed in charge of the institution. Thus we found matters when, on July 1, 1893, we first met and organized.

At our next meeting, July 7, 1893, Warden Samuel E. Chamberlain tendered us his resignation, to take effect August 1st, next following, which was unanimously accepted. On the 24th

day of July of the same year, at a meeting attended by all the directors, Jabez L. Woodbridge of Hartford, Conn., was appointed Warden, and was directed to take charge of the Prison on August 1, 1893, until which last-named date General Haven remained in charge. On said August 1st, the Rev. Eugene F. Atwood and Edward G. Fox, M.D., were returned to their duties as Chaplain and Physician respectively. On March 14, 1894, the Rev. Eugene F. Atwood tendered his resignation as chaplain, to take effect on June 1st next following; this resignation was accepted, and on July 17, 1894, the Rev. Dighton Moses of Granby, Conn., was appointed to fill the vacancy. These are all the changes of Prison officials made by us.

An examination of the Prison revealed that its condition was not a credit to the State, that it was not fit for the proper confinement of prisoners, and that it was our duty to at once undertake the extensive repairs and improvements which have continued to be made until the present time. Many of these were made at the urgent suggestions of the State Board of Health, which we felt bound not to ignore. We have thus expended a considerable sum of money, but we feel that this has been done judiciously and economically, and that the condition of the Prison fully warranted us to do so.

While on the one hand an expenditure greater than usual became necessary, on the other hand, the income from the labor of the convicts proved less than in other years. This was chiefly due to the fact that of the six contracts for convict labor, three had expired before July 1, 1893, and the others terminated soon thereafter. Owing to the general depression of business then and still prevailing, we found it impossible to make new contracts without concessions to the contractors. In fact, we have not yet been able to find paid employment for all the prisoners, and, with a view of employing those not under contract, many of the changes made in the out-buildings and grounds and an additional amount of farm work were undertaken. In making selections for this outdoor labor, due regard was had not only to the length of sentence and disposition, but also to the state of health of the prisoners.

In our endeavors to improve the physical well-being of the inmates of the prison, the necessity for which had been strongly pointed out to us by the State Board of Health, a system of out-door exercises (calisthenic drill) was instituted, the good effect of which is plainly evidenced by the increased appetites,

healthier appearance, and more cheerful disposition of the prisoners.

With the same object in view, changes have been made in the prison fare by raising the quality and adding to the variety of the articles of food, which were effected without an increase of cost in this particular.

The water supplied to the prison is still as "turbid and unwholesome" as our predecessors reported it in 1891, and the time passed since then and the consequent aging of the cement pipe through which it is furnished, have increased "the risk of accidents which would cut off or diminish the amount of water needed for daily consumption." We have under consideration a change of supply which, if made, will obviate that danger and will give a much better quality of water, at little, if any, additional expense.

From the referred to additions to this report it will be seen that the number of convicts has largely increased during the past year. If the increase continues, as seems probable, additional cell-room must be provided, and we endorse the recommendation made on this point by the Warden. Of the other recommendations made in the report of the latter, and for the reasons therein stated, we endorse, as the most important, that which refers to the erection of a ward for insane convicts. We likewise deem advisable the acquisition by the State of the eight acres of land adjoining the prison property on the east, a step which has been repeatedly urged by former directors.

During the time covered by this report we have, once every month, thoroughly inspected the Prison and audited the accounts of the institution. In addition to attending the twenty meetings before mentioned, we have individually made frequent visits to the Prison and have kept ourselves well informed regarding its condition and of the happenings within it. From the knowledge which we have thus gained we are pleased to be able to report that during the present management the sanitary arrangements of the institution and the health of its inmates have been noticeably changed for the better, that the prisoners have been kept under strict control without recourse to bodily or other severe punishment, and that no escape has occurred. The discipline of the place and the harmony existing between the officials is all that can be desired. The constant personal supervision exercised by the Warden over the numerous changes inaugurated during the

past year, and his careful attention to the many details involved in the administration of the affairs of the institution, are duly appreciated and have been productive of much good. He, and in fact all the officers, are, in our opinion, animated by a strong desire to do their duty to the best of their ability.

Respectfully submitted,

CHARLES F. BOLLMANN,
EDWARD M. CHAPIN,
FRED'K A. SPENCER,
FRANK C. SUMNER,
MICHAEL W. LAWTON,
JOHN N. CHITTENDEN,
MARVIN H. SANFORD,

Directors of State Prison.

WARDEN'S REPORT.

To the Honorable Board of Directors of the Connecticut State Prison,
CHARLES F. BOLLMANN, President.

GENTLEMEN:—

I have the honor to herewith hand you my first report as Warden of the Connecticut State Prison, together with financial and statistical tables showing the condition of the institution at close of the fiscal year ending September 30, 1894.

On August 1, 1893, at 12 M., by your direction I assumed charge of this institution, relieving General George Haven, who had been placed in temporary charge, pending the outcome of a legislative investigation.

Owing to the crude manner of keeping the books and meagre records kept on file, I am unable to give a detailed showing of the condition of the institution, financial and otherwise, for the period from the date of the last report, September 30, 1892, to August 1, 1893. Perhaps others familiar with the system employed would be able to do so. Financial tables follow, showing the receipts and expenditures from the date of the last report to July 1, 1893, covering the combined administration of Generals Chamberlain and Haven, and General Haven's administration for the month of July, 1893, with the State Auditors' certificates attached thereto. From August 1, 1893, to September 30, 1894, the close of the fiscal year, covering the 14 months of my administration, you will find following a full and concise tabulated report of the financial condition, receipts, and expenditures, and tables and figures of importance and interest.

Fully appreciating the honor conferred upon me by your Honorable Board in my appointment to the position of Warden, allow me to say that had I realized the condition of the institution, both internal and external, I would have hesitated long before accepting the position; but, once at the helm, I have endeavored with my best effort and judgment to meet the re-

quirements of the place, however onerous and irksome they may have been, as I was in duty bound, both to you and to myself.

On assuming charge, August 1, 1893, I found 316 convicts confined in the institution, and 27 men and one woman acting as officers and watchmen to maintain the discipline and preserve order. In the office, what bookkeeping and records were kept was being done by a convict. One roll-top desk, one table, a safe, and a few chairs comprised the furniture. Steps were immediately taken to properly furnish the office, double-entry bookkeeping instituted, record books and blank reports supplied, and the accounting for a business amounting to nearly one hundred thousand dollars ($100,000) in fourteen months was put into the hands of a competent bookkeeper, from which course hundreds of dollars have undoubtedly been saved to the State, as shown by the Auditors' report of accounts up to August, 1893, and moneys refunded for bills paid twice.

The following new record books have been introduced, adding greatly to the accurate knowledge of the institution and its inmates, to wit: Convict Register, Officers' Roster, Punishment Record, Ration Book, Hospital Record, Physical and Mental Record of Convicts, Prisoners' Property Record, Daily Assignment of Convicts, together with daily and monthly reports from the Deputy Warden, Physician, Overseers of shops, night and day Guard Room Officers, Report of Visitors, and Receipts from same, Relief from Duty, and Vouchers from the head of each department of all articles received and passed out of the Prison,— a system that absolutely prevents any bills being paid without the articles having been received.

Disbursements for the Fourteen Months Ending September 30, 1894.

SALARIES.

The sum of twenty-two thousand four hundred ninety-six dollars and eighty-two cents ($22,496.82) has been paid for salaries for the fourteen months, covering an average of 30$\frac{6}{7}$ persons per month under pay by the institution. This covers all moneys paid for the care of prison property and convicts.

The average number of prisoners confined during the time was 351$\frac{1}{14}$, making a cost of 15$\frac{25}{100}$ cents per capita. (See table.) In this connection I desire to say that the small salaries paid to

the officers of this institution bring but comparatively few suitable applicants for positions and gives the Warden but small scope in his selections. When it is borne in mind that the lives of the officers, as well as the safe-keeping of the convicts, depends upon the honesty, integrity, efficiency, loyalty, and temperate habits of the men that can be hired to fill the place of Watchman at thirty-five dollars ($35) per month and board, the wonder is that for the fourteen months past we have been free from escapes, abuses of prisoners, or that fatal altercations have not arisen. Plenty of brawn can be had for the money, but brains as well as brawn are required in an institution of this kind, and it has been only under the most fortunate circumstances for the Warden that he has been enabled to secure so good a class of officers. It is only with a corps of first-class officers under him that a Warden can look forward to a successful administration.

PRISON PROVISION.

There has been expended for provisions for convicts for the fourteen months the sum of thirteen thousand and fifty-five dollars and sixty-two cents ($13,055.62), from which should be deducted two thousand two hundred and seventy-eight dollars and eighty-five cents ($2,278.85), the amount remaining on hand October 1, 1894, as per inventory, leaving a balance of ten thousand seven hundred and seventy-six dollars and seventy-seven cents ($10,776.77), as consumed, which divided *per capita* among the $351\frac{1}{14}$ convicts makes a total cost of $7\frac{3}{10}$ cents per man per day. (See table.) This good showing has only been made by the closest attention to the purchasing of food. A larger quantity, a better quality, and a greater variety (see table of rations) has been furnished than ever before. Close attention has been paid to the proper cooking and seasoning of the food, and all articles of food are subjected to a thorough examination by a committee appointed by the warden for that purpose before being accepted. The prison physician is also required to inspect the food once each week on different days, to assure the proper quantity, and to see that it is properly cooked and seasoned. The table of rations fails to show the full variety, as such articles as corn, succotash, tomatoes, onions, bread and Indian meal pudding, and apple sauce, and sugar and milk in tea and coffee has been furnished the men in addition to the regular fare whenever circumstances and the season allowed. The fish rations, Fridays, has been varied

from week to week by supplying alewives in their season, mackerel, salmon, and fish chowder.

Since assuming charge I have made it a practice to visit each prisoner in the institution on Sunday afternoons, thus giving all an opportunity to make any complaint or state any grievance they may have, and if found reasonable to correct the same. This course has caused a better feeling toward the warden by the convicts, and has resulted in great good, making the convict feel that the warden is interested in his welfare and giving the warden an opportunity to study the disposition of his men, thereby being better enabled to deal with them when reported for disobedience of orders. On my first Sunday I had 241 complaints about the food. This dwindled to none in a short time, and it has been months since a complaint has been made of that nature. A hungry man is an ugly man, and although, as will be seen by reference to the ration tables, a sumptuous meal is not furnished, yet there is a good variety, and the quality and quantity is beyond question. It is false economy to poorly feed the men. Such food should be furnished as will not only sustain life, but keep up strength, that the State may get their labor in return. A sick man is an additional expense to the State, besides causing the loss of his labor. I desire still further to add to the variety of their food the coming year.

LIGHT, FUEL, AND WATER.

The amount expended for light, fuel, and water, as shown by profit and loss sheet, amounts to ten thousand two hundred and sixty-one dollars and seventy-two cents ($10,261.72), from which deduct three thousand four hundred and ninety-two dollars and thirty cents ($3,492.30), as supply on hand as per inventory, there remains the sum of six thousand seven hundred and sixty-nine dollars and forty-two cents ($6,769.42), as the cost of heating, lighting, and water supply for the $351\frac{1}{14}$ men, which shows an average cost of $4\frac{59}{100}$ cents per diem. This is not absolutely correct, as the amount expended for fuel covers the cost of motive power, for which the institution received one thousand six hundred and eighty-two dollars and ninety-six cents ($1,682.96), which amount properly should be deducted from the cost of furnishing light, fuel, and water per man.

CLOTHING AND BEDDING.

The amount expended under this heading — three thousand seven hundred and thirty-nine dollars and sixty-nine cents ($3,739.69) — covers blankets, sheets, shirts, pillow-cases, bed-ticks, straw, under-shirts and drawers, suits of clothing worn by both inside and outside men, shoes, stockings, and all wearing apparel, together with the citizen's clothes furnished to convicts at the expiration of sentence. There remained on hand (as per inventory) articles valued at two thousand seven hundred and eighteen dollars and fifty-eight cents ($2,718.58), leaving an actual expenditure of one thousand and twenty-one dollars and nineteen cents ($1,021.19), which shows the cost per man per day to be $\frac{69}{100}$ cents (see table) taking the monthly average of $351\frac{1}{14}$ men. Formerly, second-hand clothing was furnished to discharged men, but owing to the low price and by considerable effort I have been enabled to furnish men new clothing at a less price than formerly was paid for second-hand. Each discharged man is supplied with a new suit of underclothing, bosom shirt, collar, necktie, hat, shoes, stockings, and new suit of clothes.

MEDICINE.

Medicine has been furnished amounting to nine hundred and forty-five dollars and eighty-two cents ($945.82), and there remained on hand September 30, 1894, medicine supplies amounting to three hundred and fifty dollars ($350.00) (see inventory), leaving a balance as expended in the care of the sick of five hundred and ninety-two dollars and eighty-two cents ($592.82), making a daily cost per capita of $\frac{4}{10}$ of a cent, as per average above. (See table.)

TOBACCO.

For this commodity there has been expended three hundred and ninety-six dollars and sixty cents ($396.60), leaving on hand (as per inventory) thirty dollars' ($30) worth, which would leave a net expenditure of three hundred and thirty-six dollars and sixty cents ($336.60), which at the above average number of convicts would be at the rate of $\frac{24}{100}$ cents per capita. (See table.)

From the above average cost per diem it will be found that it has cost for salaries, light, fuel, and water, clothing, bedding, medicine, and tobacco $28\frac{47}{100}$ cents per capita. (See table.)

This covers the full cost per day for the maintenance, care of, and detention of the convicts committed to this institution for the term of fourteen months ending September 30, 1894. In view of the fact that this moderate expense has been brought about in the face of the many and varied improvements for the general welfare of the convicts, I feel confident this showing will meet your approval.

PROVISION FOR WARDEN'S FAMILY, OFFICERS, AND PAID HELP.

The number for whom it has been necessary to cater for the fourteen months is found to be an average of 30⅘ persons per day.

Six thousand eight hundred and forty-four dollars and eighty-two cents ($6,844.82) has been expended for provisions of which there remained on hand October 1, 1894, two hundred and fifty-four dollars and twenty cents ($254.20) (as per inventory), leaving the value of provisions actually consumed at six thousand five hundred and ninety dollars and sixty-two cents ($6,590.62), which, at the above average number, would cost $50\frac{85}{100}$ cents per day for each paid employe. When it is taken into consideration in addition to the above daily number, that amount covers the cost of entertaining all State officials and others, it would seem that due care and economy have been exercised.

EXPENSE ACCOUNT.

This account covers all moneys paid for furnishing the general office with furniture, books, blanks, pens, ink, paper, postage stamps, *et cetera ;* for feed furnished an average of 80 head of live stock, record books furnished to hospital, barn, and stable expense, cook, house-maid, and porter for warden's family and officers, etc. It amounts to three thousand seven hundred and seventy-eight dollars and eighty-four cents ($3,778.84). From this amount should be deducted three hundred and seven dollars ($307), the amount of furniture so inventoried in warden's office, leaving a balance of three thousand four hundred and seventy-one dollars and eighty-four cents ($3,471.84).

LIBRARY.

The maintenance of the library has cost ninety-seven dollars and eighty-one cents ($97.81) for tools and material for rebinding books, printing, re-cataloguing books, and other supplies. The chaplain acts as librarian.

FURNISHING WARDEN'S HOUSE.

The furnishing of the warden's house has cost one thousand seven hundred and sixty-eight dollars and fifty-seven cents ($1,768.57). The house was almost devoid of furniture and furnishing when the present warden took possession, and such as remained were old and much the worse for wear. Carpets were found in some of the rooms and halls, but in bad condition, as a rule. Even dining-room chairs had to be purchased or taken from the officers' table before you, gentlemen, could sit to your meals. Even the warden's personal furniture had to be put up for the night for use in his sleeping apartment. It is not necessary for me, however, to make an extended report on this subject, as you are personally familiar with the whole matter. The articles purchased have been of substantial make, and due economy has been exercised in their selection.

OFFICERS' QUARTERS.

There has been expended the sum of five hundred and sixty-one dollars and thirty-two cents ($561.32) in furnishing the officers' quarters. Plain but substantial material has been selected and the officers are now comfortably housed.

The condition of their quarters on August 1, 1893, was simply a shame and disgrace to the State. From four to six men were huddled together in dark and dingy rooms with partitions as high as one's head between the beds, like horse stalls; the paper and plastering of the walls smoked and smeared with oil to kill the vermin that swarmed in the cracks of the floor, ceiling, and walls. All this has been changed by your direction. The interior was torn out, and twelve light, airy, and well ventilated rooms have been built; steam heat and gas supplied, and each officer has a room to himself, supplied with closet room, bureau, bed, stand, two chairs, and carpet. A bath room has been arranged with closet, bath-tub, and lavatories with hot and cold water. The change has been very beneficial, and duly appreciated by the officers.

CHAPEL.

For the benefit and use of this department of the institution there has been expended the sum of four hundred and eleven dollars and five cents ($411.05); expenses of Sunday-school teachers, supplying the pulpit with services on Catholic Sunday, so called, and supplying persons to conduct Protestant services,

organist, and various other minor items. On March 14, 1894, Chaplain Atwood's resignation was accepted by your honorable board, and from that time to August 1, 1894, the duties of Chaplain were performed by parties engaged by the Warden at your direction. On August 1, 1894, the Rev. Dighton Moses was installed.

FURNISHING HOSPITAL.

The hospital was found, in the way of beds and conveniences, devoid of the commonest necessaries of such a department. (See the Prison Physician's report.) The sum of seventy-two dollars ($72) has been expended for additional furnishing of this department.

ADVERTISING.

The sum of forty dollars and thirty-five cents ($40.35) has been expended for advertising for proposals for contracts to furnish coal and meats for this institution, and advertising the first application of convicts for pardons.

AMUSEMENTS.

I desire to extend my thanks to the various societies and individuals who have so kindly volunteered their services for the improvement and amusement of the convicts. The beneficial effect on those confined here by an hour's relaxation from the steady routine of prison life, and forgetfulness of self for the time by the entertainments, cannot be calculated. It has taken the scowl out of many a face, sweetened dispositions, and temporarily relieved them from the continual brooding over their misfortunes, and has undoubtedly prevented many from the actual loss of reason. I would respectfully recommend that more be done in this line, and, instead of depending entirely upon voluntary assistance from the kindly and humanely disposed, that a reasonable amount be authorized for this purpose. From November to March last an average of two entertainments per month were given. Eleven dollars were paid toward the expenses incurred of those who voluntarily furnished the entertainments.

NIGHT SCHOOLS.

For the same reasons as above the night schools have been a great assistance to the welfare of the institution, as well as relieving the officers of much extra labor. As is known, many are confined here who when they enter are unable to read or

write. Such have no means of employing their unoccupied time. The State kindly furnishes money for a library for the benefit of the convict, yet many are deprived of that benefit from lack of knowledge. Officers are required to read and write letters for such, and only those who can neither read nor write are taken into the schools. When they can read intelligently and write legibly they graduate. The sum of forty-five dollars and eighteen cents ($45.18) has been paid for books, writing material, and supervision of the men while in school. The Chaplain acts as instructor.

FURNISHING DIRECTORS' ROOM.

The room formerly furnished and known as the Warden's library was found entirely devoid of furniture with the exception of seven chairs, a mirror, and the carpet. The bookcases had been removed and every article of furnishing taken away. This room has been renovated and moderately furnished as the Directors' room and Warden's private office at an outlay of three hundred and ninety-one dollars and sixty-two cents ($391.62).

UNIFORMS.

The officers of the institution being required to wear a uniform while on duty, it seemed desirable that some State button other than a National Guard button should be worn. By your order a C. S. P. button has been procured and furnished to the officers, to whom they are charged, and turned in when leaving the service of the institution. The design was gotten up by Maj. F. A. Spencer, a member of your Board. This is the only article for uniforms that is furnished by the institution. The expense incurred for buttons has been sixty-three dollars and eleven cents ($63.11), and the institution owns the dies.

INSURANCE.

As the buildings outside the Prison walls containing the live stock, carriages, wagons, hay, grain, and material in carpenter's shop, was wholly unprotected from fire, it was deemed advisable to place a proper insurance on same, which has been done at an expenditure of two hundred and forty dollars and eighty-one cents ($240.81) for the term of three years.

EXECUTION HOUSE.

The General Assembly of 1893 passed an act (see Chapter CXXXVII, Public Acts) requiring all executions to take place

within the walls of the Connecticut State Prison, and appropriated the sum of three thousand dollars ($3,000) for the purpose of erecting a building suitable for carrying into effect the provisions of the law. Immediately upon the commitment to this institution of John Cronin, condemned to be hanged on August 24, 1894, your honorable board convened, and immediate steps were taken to carry out the law. Bids were called for and the contract awarded to McKone Bros., Hartford, Conn., for the building, and the Van Dorn Iron Works Co. of Cleveland, Ohio, for one steel cage. Three members of your Board, together with the Warden, were selected as a Building Committee to superintend the work, and close attention to every detail was given. As the execution was ordered for August 24th it became imperative to complete arrangements, and the total cost of building and appurtenances amounts to three thousand six hundred and twenty-seven dollars and eleven cents ($3,627.11) as follows: building, $2,190.63, cage, $1,043, gallows and appliances, $393.48, total, $3,627.11.

FARM ACCOUNT.

The profit and loss sheet shows a loss to this account of sixty-nine dollars and twenty-three cents ($69.23). This is erroneous from the fact that the product from the farm has been inventoried at seven hundred and thirty-nine dollars and fifty cents ($739.50), and placed to the credit of prison provisions on hand, from which deduct the sixty-nine dollars and twenty-three cents ($69.23), and a net profit will be shown of six hundred and seventy dollars and twenty-seven cents ($670.27). This amount is much below expectation, owing to the extreme drought the past season, but fully demonstrates the fact there is money saved to the institution by utilizing the unemployed convicts in farm work.

PRISON SUPPLIES AND TRANSPORTATION OF CONVICTS.

The moneys expended and charged to the above accounts are for supplies used in the prison, and found in the inventory of prison supplies on hand, and for expenses incurred in the transportation of insane convicts to and from the insane hospital at Middletown.

IMPROVEMENTS AND REPAIRS.

As shown by the profit and loss sheet, there has been expended in the fourteen months the sum of twenty-one

thousand three hundred and fifty-three dollars and forty-four cents ($21,353.44). This amount appears large, but when the condition of this institution, both internal and external, as found on August 1, 1893, is taken into consideration, it would seem to be only a reasonable amount. Time and space forbid a detailed statement of the condition of the buildings, steam, gas, and sewer arrangements within, and barns and other buildings outside of the prison walls. Apparently, nothing had been done for years to keep them in repair. Every roof on the premises, except the warden's house and contractors' shops was leaking like a riddle, water gutters out of repair and conductors gone, chimneys had tumbled down, others on the point of falling. Steam-pipes through the institution were twisted and warped so that it was almost impossible to get heat, and when furnished it was only at the expense of quiet and sleep, owing to the pounding of the pipes. Sewer-pipes were twisted and leaking and permitting the escape of sewer gas into every department. An old 75-light naphtha gas machine was being used to furnish gas for 250 jets with poor success. A new 300-light machine was provided and has proved a good investment, as by its use the price per gallon of the naphtha used has been reduced seven cents per gallon, which is good interest on money expended for new machine. The interior walls of the main building were dirty and foul for want of paint. There was no water supply for protection from fire in the east yard of prison, or for the State buildings outside the walls; bake oven cracked, out of repair, and unfit for use; officers' quarters in the worst condition possible; horse barn with sills rotted away and floor unsafe; piggery unfit for the keeping of swine; roof leaking, sills, floor, and pens rotted away beyond repair, and standing low down where the pens took all the wash from the back-yard, making the place foul and loathsome; no place for storing coal required in excess of the capacity of the coal bunkers, some 200 tons being piled out of doors for want of storage room. The fire-boxes to steam and heat boilers had to be rebuilt and new grates furnished; adequate quarters had to be built for the front guard; prison walls left unfinished at the completion of new block had to be finished; owing to the large increase of male convicts it was found impossible to do the extra amount of washing with the eight female convicts confined in the women's department, and a laundry for men's washing had to be arranged for; outside stairs to State shop had to be rebuilt; proper safeguards for the prevention of

escape through the guard room by convicts, or general delivery of the inmates by outside parties, had to be added; ladders and platforms for the proper surveillance of the convicts coming and going from their cells were provided. As stated above, only a general idea can be given of the necessities requiring the outlay of the above amount, but enough has been cited to give a general idea of the condition and improvement. All the above-enumerated requirements by your direction have been attended to in a substantial and economical manner. Contracts have been made for some of the work with outside parties by your Board, but much of the repairing, rebuilding, and renovating has been done by convicts, at an outlay for material only. All this and more has been done in the fourteen months, and to-day the institution is in first-class order, and a credit to the State. Your building committee has had a general supervision of the work, and to them much credit is due.

Receipts for the Fourteen Months Ending September 30, 1894.

MOTIVE POWER.

There has been received from contractors one thousand six hundred and eighty-two dollars and ninety-six cents ($1,682.96) for motive power from five shops, at the rate of twenty-five dollars ($25) per month per shop. This amount, in my judgment, is much less than the cost, and as there were but five shops under contract this materially reduced the receipts for the time. Previous to the erection of the new shops, contractors furnished their own power, yet paid the same price per day for convict labor. Additional and heavy machinery has been added from year to year, with no additional cost for power or increase in price paid for convict labor. The institution should at least be reimbursed for its outlay and sufficient paid per horse-power required to run the machinery, to cover cost.

SALES ACCOUNT.

From sales made for articles that have accumulated from various sources, there has been received the sum of three hundred and seventy-seven dollars and ninety-seven cents ($377.97). (See tables for items.)

VISITORS' RECEIPTS.

Five thousand and eighty-three visitors have inspected the institution during the fourteen months, paying at the rate of

25 cents apiece for adults, the receipts from which amount to one thousand two hundred and seventy dollars and ninety cents ($1,270.90). It is an open question, in my opinion, whether the admittance of visitors indiscriminately for pay is for the best interest of the institution. The income received does not pay the extra expense required for officers to act as escort, not taking into consideration the annoyance and trouble often incurred to accommodate the patrons. Imagination can picture what might occur, should confederates of those confined here gain admission for their quarter, prepared to assist in a break, convey intelligence, or surreptitiously convey tools or arms to their friends. My view is, that admission should be free, and only those admitted who come with State officials, or on indorsement of responsible citizens.

CONVICT LABOR.

The receipts for labor are far below what they should have been. It was found that out of the six contracts for men, three had expired a long period prior to August 1, 1893, but the men were being worked under the conditions of the expired contracts. In attempting to renew these contracts it was found that concession would have to be made either in price per day, or an allowance made in time. The latter course was adopted and the per diem for labor for 145 to 150 men for two months had to be allowed. This reduced the receipts from this source quite materially. Also, two contracts were reduced to one with a less number of men, leaving the receipts for motive power less by twenty-five dollars ($25) per month for fourteen months, and also leaving one shop unoccupied by contract labor. In renewing the contract that expired after August 1, 1893, the same concessions as to allowance of time for convicts' labor had to be made; all of which has materially reduced the receipts from this source. On September 30, 1894, there were 236 men under contract for labor at 50 cents per day. (See table for details.) On the same date 381 convicts sentenced to hard labor were confined here, out of which only 248 were under contract, leaving the large number of 133 unemployed, except such as could be utilized within and without the walls. Sufficient men beyond the requirements of the prison are available to fill up the unoccupied shop, and every effort should be made to procure employment for those lying idle.

RENT AND FINE ACCOUNTS.

There has been received for rent of the Wells house to employes two hundred and twenty-one dollars and thirty-three cents ($221.33), and thirty-five dollars ($35) has been credited back to the institution for fines imposed upon the officers for minor offenses against discipline.

COURT FINES.

Two convicts who had fines of one dollar each, paid their fines at the expiration of term of sentence.

LAUNDRY ACCOUNT.

Laundry work for outside parties has been done, for which twenty-two dollars and fifty cents ($22.50) has been received.

General Remarks.

EXERCISE.

As soon as practicable, after assuming charge, daily exercise of an hour for as many prisoners as could be safely handled, was introduced. Each morning, if pleasant, from 40 to 60 convicts are taken from the shops and marched to the east yard of the prison, and for half an hour are exercised in marching, full discipline being maintained during that time, covering a distance of from one to two miles. A half hour is then allotted for calisthenics. Every convict, unless excused by the physician, who is present, is required to exercise. They return to the shop invigorated, and prepared to eat their dinner with a relish. Appetites are increased, color restored to faces, and the listless and sullen appearance mitigated. Sound sleep is restored, and a greater ability for work assured. As an evidence of better appetites, I would state that the consumption of bread, of which each man is allowed as much as he will eat morning and noon, was increased in the first ten days of this exercise from 125 to 178 loaves. One of the contractors assures me that an equal, if not an increased, amount of work is turned off even with the loss of this hour, and that the men are more cheerful and contented. It certainly has been very beneficial in every way. This practice was continued until hot weather, when, by the physician's advice, it was discontinued until such a time in October as the grading and alterations in the yard would permit of its continuance. The exercise continues through the winter each day, weather permitting.

PUNISHMENTS.

The Connecticut State Prison was built for a penal institution and not for a reformatory. The law did not intend it to be a reformatory. Men are sentenced here as a penalty for crime committed; to be deprived of their liberty; isolated from the world for the benefit of society, and to be kept at hard labor for the term of their sentence. The construction of the prison is such that any extended reformatory measures cannot be carried out. Public opinion, however, has materially changed since the passage of the law regarding criminals, and the erection of the buildings for their confinement. The time has come when the more advanced views of this modern age should be introduced into this institution. In view of the fact that, in the immediate future, suitable accommodation must be provided for the increasing number of convicts committed here, now would seem the opportune time for the introduction of reformatory measures for the younger class of criminals. By reference to the statistical tables following it is shown that out of the 381 convicts confined here on September 30, 1894, 41 of that number were between the ages of 16 and 20 when committed; and 346 were committed for their first offense. Ample room in buildings already constructed can be utilized at a comparatively small expense for interior alterations. At this writing the number of convicts has increased to 404, a greater number than could be accommodated in the modern building should those confined in the hospital recover and be returned to their cells. If accommodations were provided, the younger and less hardened could be separated from the vicious criminal, and classification and reformatory measures introduced. But as at present arranged reformatory measures cannot, except incidentally, be carried out. Neither can penal institutions be successfully managed by love or a club. A happy medium between sympathy and severity meets with better success. Men committed here are human beings, if criminals, and should be treated in a humane manner. Kindness with firmness should be the governing principle. With but few exceptions all men have in their hearts a spark of manliness left, which should be found and built upon if possible. They should be taught that never is punishment meted out for the sake of punishing, but as a correction for violation of rules or misdemeanors, and great care should be exercised that no innocent person suffers punishment. Better let six guilty men escape rather than punish one who is innocent. Punishment should

be graded to meet the viciousness of the culprit. Every convict should have a hearing before punishment is inflicted and given the benefit of the doubt, should a doubt exist as to his guilt. The dispositions of the men vary, and good judgment should be exercised in dealing out punishments. Excessive punishments should be avoided, except in extreme cases, but justice should be done at all times. Governed by these views, punishment in this institution has been reduced to a minimum, and no excessive punishments have been inflicted or required.

SICKNESS.

The institution has been comparatively free from epidemics, yet the sick list for the time has been greater than it should be. Every effort has been made for an improvement in this direction and with some success. Ventilation and sewerage has been looked after, and all sanitary precautions taken; food and clothing of good quality and in sufficient quantities supplied; exercise introduced and an effort made under the advice of the State Board of Health to ameliorate these conditions. By reference to the physician's report, it will be seen that the large number of lung troubles is attributed to the use of acid vinegar heretofore furnished, and that upon its disuse the number decreased to a minimum. Undoubtedly, the physical condition of the men when admitted, and vicious habits persisted in here, are largely the cause of physical decay, but I am free to say that the location of the institution has much to do with the whole trouble. I would respectfully refer you to the physician's report for details upon this subject.

INSANITY.

During the fourteen months from August 1, 1893, to September 30, 1894, there has been sent to the Insane Asylum at Middletown 16 convicts, and returned from there as cured, 11, leaving 22 convicts still at Middletown who are carried on the books of this institution. At least a dozen convicts have been transferred back and forth repeatedly. I am satisfied that this course is both detrimental to the men and the institution. A lunacy commission has to be convened at considerable expense, both here and at Middletown, before they can be transferred either way. When once a man is pronounced insane by a commission he is relieved both morally and legally from his acts. Vicious dispositions take advantage of that well-known fact, which materially increases the hazard of the

officers. The discipline being relaxed at the hospital the returned men take advantage of the fact of their being declared insane and try by every means to get sent back to the asylum. Escapes are more frequent there than here, which is soon mooted about the prison, and men often feign insanity for the purpose of being sent to Middletown. Many other good and substantial reasons could be advanced why an insane ward should be established at the Connecticut State Prison.

ESCAPES.

I am pleased to be able to state that no convict has escaped during my administration. It has been necessary to take a large number of convicts outside the walls of the institution to perform the manual labor required in the construction, alterations, and other labors performed. At all times quite a number of men are required daily to work outside the walls, and a constant menace to their safe keeping lies in the tangle of underbrush and woods growing on land east of prison property. Nearly every convict that has escaped from the institution in the past has accomplished it through this avenue. This land should belong to the State, be cleared up, and put under cultivation, thus removing the constant danger and bring a revenue to the State.

BIRTHS.

On September 3, 1893, Mary Hurst, a female convict, sentenced May 10, 1893, for one year for bigamy, gave birth to a male child. Mother and child were properly cared for and discharged March 20, 1894.

DEATHS.

Eighteen convicts have died in the fourteen months, out of an average of $351\frac{1}{14}$, making the percentage of deaths a trifle over 5 per cent. As per records, 16 died in 1892 and 15 in 1893. The mortality rate has lessened greatly. Six of the above number were life prisoners. (See table of deaths.) The death of three life prisoners is directly attributable to the grip epidemic last winter. No other deaths occurred from that cause. I would refer you to the physician's report for cause of deaths and other details.

CONDEMNED CRIMINALS.

One John Cronin was committed to this institution sentenced to be hung August 24, 1894, and was reprieved to October 24th by the governor. Again a reprieve was granted

to December 18th, for the purpose of allowing his case to come before the Board of Pardons. He is still in confinement, awaiting the outcome of the hearing. His health is slowly failing under the strain of the delay and uncertainty of the result.

DISCIPLINE.

It is with pleasure I am able to state that the discipline of both officers and convicts, as a whole, meets my hearty approval. Officers are courteous in their intercourse with one another, kind and humane in their treatment of the prisoners, and prompt and efficient in their duties. The prisoners, as a rule, are respectful and obedient to their officers. During an extended trip through the West, by your direction, I visited several of the penal and reformatory institutions in that section, and I returned home fully satisfied that we are equaled by few and excelled by none, and I desire to express to the officers of this institution my appreciation of their efforts and results obtained.

RECOMMENDATIONS.

I would respectfully call your attention and earnest consideration for the reasons given above, and many others that might be advanced, to the following recommendations:

An increase of the salaries of the watchmen;
Additional accommodation for convicts;
The erection of an insane ward for convicts;
And the purchase of eight acres of land adjoining the State property on the east.

In conclusion, I desire to say that to Deputy Warden Baisden, Physician Fox, and Chaplain Moses I am greatly indebted for the faithful and efficient manner in which they have performed their several duties, and to them is equally due the credit for any successes attained. And to you, gentlemen of the honorable Board of State Prison Directors, I wish to extend my thanks for your courteous and kindly treatment, and for the encouragement and advice given.

Trusting that my efforts for a successful administration of the affairs of the Connecticut State Prison have met your approval,

I have the honor to remain,
Yours very respectfully,
JABEZ L. WOODBRIDGE,
Warden.

CHAPLAIN'S REPORT.

To the Honorable Board of Directors of the Connecticut State Prison, Hon. CHARLES F. BOLLMANN, Chairman.

GENTLEMEN: —

The report of your Chaplain must of necessity be brief, as it can cover the work of only two months — from August 1st to September 30th. When the present Chaplain assumed his duties in this institution, the prison had been without the services of a regular chaplain for four months, and as a consequence the work in this line had somewhat deteriorated, and was at a rather low ebb.

Two months are not sufficient time to more than turn the tide toward better conditions. I found the library, which is such an efficient aid in helping the inmates to be content with their confinement, in a somewhat demoralized condition, from which as yet I have not been able to resuscitate it; but hope soon to re-catalogue and re-number it, eliminating quite a number of volumes which seem to me to be, to some extent, pernicious in their influence on the reader, and replace them with such books as will be elevating in their tone, both for moral and spiritual life; and also tending to a better influence toward good citizenship.

The first of September the Monday evening prayer service and the Tuesday and Friday evening schools were resumed. The former, I think, exerts a helpful influence on certain minds for good, at least while they remain in the institution, and we hope will prove helpful to some to at least become so established in the right that they can live honest lives when they again mingle with the outside world and its temptations.

The evening schools aid those unfortunate men who, through neglect or other causes, are unable to read and write, to learn, and thus start up the hill, rather than remain at the foot; sometimes sinking even lower.

It has not seemed as yet best in this work to enter into an elaborate course of education. We realize that this insti-

tution is a penal one, and not a reformatory, only in an incidental sense.

Hence our object has been to teach the ignorant only the primary elements of an education, consisting of writing and reading, with usual verbal instruction on the use of words for expressing our thoughts.

We have put writing first, because we think that in learning to write three points are gained; namely, writing, reading, and spelling.

In this line of work I can say there is very much interest on the part of those who receive instruction; and some learn rapidly and have been encouraged to write to their friends themselves.

There are also a number who utilize a portion of their spare time in the cell in the study of the higher branches such as are usually taught in the common school.

The Chaplain has been assisted in this work by faithful teachers from among the prisoners, thus enabling him to push this line of work with more rapidity and reach a larger number.

In the more strict line of spiritual work the Chaplain has not been able to devote as much time as he could wish, owing to the many details of work given him to do, and also to the fact that the whole line of prison work in this form was new to him. He has not as yet found time consistent with other duties to give any special religious instruction, except individually a little to those in the hospital who are convalescent, and also in the female department. But as Superintendent of the Sunday-school and in other Sunday services he feels there has been a good interest manifest. In the Sunday-school, the attendance upon which is purely voluntary, there has been an increase apparently of both attendance and interest. The increase of attendance has been, I should judge, fully ten per cent., and I believe this is not because of an increase of inmates, but because of increased interest.

The special literature used in this line of work consists of Sunday-school quarterlies on the International Sunday-school lessons, furnished by the prison authorities; Sunday-school papers furnished by the kindness of Christian people. Of the latter I would specially mention two, the *Sabbath Reading*, a most excellent paper, which is given to the men every Sunday, there being 78 copies furnished, I have recently learned, by a Christian lady.

This paper the men like very much, and the Chaplain and the men would be pleased and thankful if there were 125 copies so that every Sunday-school attendant could receive a copy.

There are also 25 copies of the *Catholic Review*, a most excellent paper for the Catholic men, circulated by their teachers.

We wish that some benevolent Catholic, of whom we are sure there are many, would increase this number to 75 copies, that all who desire might have them. Your Chaplain feels that it is proper to say that the corps of teachers who come here from Sabbath to Sabbath to do this work for their weaker fellow-men should have, and do merit, the hearty thanks of your honorable board.

The usual preaching services have been held, to which the men in a body come, with a very satisfactory show of interest.

The second Sunday in each month being given for the purpose of a Catholic service, the Chaplain has felt that every Catholic in the institution should attend that service if able, and to that end he fails not to urge them so to do.

There have been fifty Bibles purchased, so that now every man can have the Word of God in his cell. Many who cannot read English readily have been furnished with Bibles in their own language. Many have also been furnished with both Protestant and Roman Catholic prayer books for use in the cell.

Respectfully submitted,

REV. DIGHTON MOSES,
Chaplain.

PHYSICIAN'S REPORT.

To the Hon. Board of Directors of the Connecticut State Prison,

GENTLEMEN: —

I herewith present my report from September 30, 1892, to September 30, 1894, inclusive.

During the above period there have been one hundred and thirty-two (132) cases treated in the hospital. Of these, thirty-one (31) have died — phthisis pulmonalis, 12; valvular disease of the heart, 5; haemoptysis, 4; diabetes, gastritis catarrhalis, syphilis, asthma, pneumonia, apoplexy, "la grippe," acute cerebral meningitis, cardiac dilatation, typho-malarial fever, each one.

Since August 1, 1893, the percentage of deaths to the number of inmates has been about $5\frac{12}{100}$ per cent.

At the present time there are fourteen (14) confined in the hospital. Of this number, five (5) are suffering from phthisis pulmonalis, three (3) of these are in the incipient stage; scrofulous abscess of thyroid gland, diarrhœa, old age, hemorrhage of lungs, debility from masturbation, dropsy, scrofulous diathesis, syphilis, each one (1); also a cripple who is confined to a wheel chair.

The number of men from the shops on the "sick list" for the past fourteen (14) months are as follows:

1893.		February,	559
August,	716	March,	623
September,	617	April,	551
October,	588	May,	599
November,	578	June,	585
December,	639	July,	631
1894.		August,	685
January,	1,030	September,	555
Total,			8,956

The above figures do not include the female department, or those sick in the hospital. The complaints, of course, have been

varied in their nature. Disordered digestion, neuralgic affections, rheumatism, and skin diseases, have been notably common; most of them have proved mild and tractable, yielding readily to treatment.

The epidemic of "la grippe," which occurred in December, 1893, was not unusually severe as compared with other locations; about one-third were sufferers from it, three deaths occurring as a result (viz.), a female convict who had been feeble a number of years succumbed to it; one male convict contracted pneumonia and only lived a few hours. Another, an old man, suffered an apoplectic attack, from which he never recovered.

During March and April of the present year, we had about twenty-five (25) cases of facial erysipelas, which yielded quite readily to treatment. During the prevalence of the disease, we saw a necessity of a contagious ward, where we could isolate such cases. On consultation with the warden, it was decided to make a contagious ward, which was done as soon as possible. It is a large room connected with the hospital by a passage-way and is equipped for any contagious diseases which may appear hereafter.

One very great improvement which was done last spring, is the fitting up of the hospital with new iron beds with springs, which are very much more comfortable for the inmates than formerly. The bath-room connected with the hospital has also been supplied with hot and cold water, which can be had at all times.

During the summer of 1893 and previous, it was noticed that a large number of convicts were suffering from hemorrhage of the lungs. Upon enquiry it was learned that in nearly every case a large quantity of vinegar was used previous to the hemorrhage; on investigating the matter it was discovered that cider vinegar was not being used. A change was made, and the best cider vinegar procured, and since that time we have only had two cases of hemorrhage of the lungs, and I am thoroughly convinced that the acid vinegar caused the hemorrhages.

Early in the fall of 1893, the warden inaugurated a military drill for the convicts, the effect of which is very beneficial. Each shop is allowed one hour each week; the men are marched into the east yard and required to go through a drill, the exercise developing the muscles which are not brought into use at their work in the shop. The majority of the men

enter into it with a will, and seem to thoroughly appreciate it. A short time after the drill was inaugurated, the consumption of bread alone increased nearly fifty (50) loaves a day.

Since August 1, 1893, all convicts, when they enter prison, receive a thorough physical and mental examination; this, with weight and everything pertaining to their condition, is kept on record. Since the above period there have been two hundred and forty-eight (248) males and four (4) females admitted; of this number, only one-half were able-bodied and sound. About one-quarter of the balance had phthisical development, the same proportion suffering from intemperance and scrofula, venereal disease predominating. A large number are broken down from the effects of alcohol and syphilis in their system for many years previous to entering prison. The habits of their past lives and the tendency of life in prison to impair the health and especially to develop tubercular disease of the lungs or pulmonary consumption, has much to do with the mortality from that disease.

During the two (2) years the lunacy commission have examined and declared insane twenty-nine (29) men, they being sent to the State Insane Asylum; sixteen (16) men have been returned as cured.

On September 3, 1893, Mary Hurst, a convict, gave birth to a boy, the second birth that has occurred in prison.

Total number of convicts, Sept. 30, 1892,	277
" " " " Sept. 30, 1894,	381

An increase of 105.

The warden has promptly and fully furnished all the necessary assistance, medicine, and supplies for the care, nursing, and comfort of the sick; and I am glad to say that my labors have been made very pleasant by his aid and support. I am also indebted to the deputy warden for his co-operation with me in the discharge of my official duties.

Respectfully submitted,

EDWARD G. FOX,

Physician and Surgeon Conn. State Prison.

WETHERSFIELD, Sept. 30, 1894.

FINANCIAL TABLES.

INCOME

From September 30, 1892, to June 30, 1893.

S. E. CHAMBERLIN, *Warden.*

Shoe Shops.

Received for work done from September 30, 1892, to June 30, 1893, nine months,	$26,847.88	
Stock on hand June 30, 1893,	3,323.20	
	$30,171.08	
Stock on hand September 30, 1892,	3,363.10	$26,807.98

Profit and Loss.

Received from visitors from September 30, 1892, to June 30, 1893,	$668.38

Motive Power.

Received for power furnished shops from September 30, 1892, to June 30, 1893,	$1,350.00

EXPENDITURES

From September 30, 1892, to June 30, 1893.

Expense Account.

Stock on hand September 30, 1892,	$16,471.91	
Board of officers and incidental expenses,	10,086.42	$26,558.33
Sundry credits to this account,	340.31	
Stock on hand June 30, 1893,	15,746.05	16,086.36
		$10,471.97

Provision Account.

Stock on hand September 30, 1892,	$1,032.30	
Amount purchased for the nine months,	8,227.17	$9,259.47
Sundry credits to this account,	290.03	
Stock on hand June 30, 1893,	1,115.60	1,405.63
		$7,853.84

Clothing and Bedding.

Stock on hand September 30, 1892,	$2,950.23	
Amount purchased for the nine months,	1,534.48	$4,484.71
Sundry credits to this account,	77.75	
Stock on hand June 30, 1893,	2,232.55	2,310.30
		$2,174.41

Lights, Fuel, and Water.

Stock on hand September 30, 1892,	$1,272.90	
Amount purchased for the nine months,	2,452.85	$3,725.75
Sundry credits to this account,	12.49	
Stock on hand June 30, 1893,	730.20	742.69
		$2,983.06

Salary Account.

Salaries of officers for nine months, ending June 30, 1893,	$12,831.24

Transportation of Convicts.

Paid for transporting convicts from the several jails for nine months, ending June 30, 1893,	$111.40

Hospital Account.

Stock on hand September 30, 1892,	$250.00	
Amount purchased for the nine months, from September 30, 1892, to June 30, 1893,	353.43 —	$603.43
Stock on hand June 30, 1893,		325.00
		$278.43

RECAPITULATION.

INCOME.

Shoe Shops,	$26,807.98
Profit and Loss,	668.38
Motive Power,	1,350.00
Expenses above Income,	7,877.99
	$36,704.35

EXPENSES.

Expense Account,	$10,471.97
Provisions,	7,853.84
Clothing and Bedding,	2,174.41
Lights, Fuel, and Water,	2,983.06
Salary Account,	12,831.24
Transportation of Convicts,	111.40
Hospital Account,	278.43
	$36,704.35

INVENTORY, JUNE 30, 1893.

Expense Account,	$15,746.05
Provision Account,	1,115.60
Clothing and Bedding,	2,232.55
Lights, Fuel, and Water,	730.20
Hospital Stores,	325.00
Shoe Shops,	3,323.20
	$23,472.60

REAL ESTATE.

Prison Buildings, Land, etc.,	$347,000.00
Steam Plant,	3,700.00
	$374,172.60

SUPPLEMENTARY FOR JULY, 1893.

GEORGE HAVEN, *Warden.*

INCOME.

Shoe shops,	$3,028.00	
Profit and loss,	187.85	
Motive power,	150.00	
Sundry credits to expense account,	61.98	
" " " provision account,	1.12	
" " " clothing and bedding account,	2.50	
" " " lights, fuel, and water,	1.10—	$3,432.55

EXPENSES.

Expense account,	$305.74	
Provisions (no bills paid in July).		
Clothing and bedding " "		
Lights, fuel, and water " "		
Hospital account " "		
Salary account,	1,529.20	
Transportation of convicts,	11.40	
Income above expenses,	1,586.21—	$3,432.55
Total amount of bills for account of the Conn. State Prison contracted by Geo. Haven, Warden, for July, 1893,		$3,832.63
Paid as follows:		
By cash received from Geo. Haven, Warden, August 1, 1893,	$2,738.59	
By cash received from T. Sisson & Co., error in May account,	128.52	
By cash from Comptroller per J. L. Woodbridge, Warden,	965.52—	$3,832.63

EXPENDITURES FOR JULY, 1893.

GEORGE HAVEN, *Warden.*

J. R. Bailey, wood,	$1.62
Spring Brook Creamery Co., butter,	23.46
Frank Mehegan, horse-shoeing,	7.00
G. M. Long & Co., fish,	16.20
F. W. Warner & Co., clothing,	85.71
Foster & Co., groceries,	169.93
W. W. Walker, groceries,	55.78
J. H. & W. E. Cone, hardware,	14.31
Cook & Hills, dry goods,	34.77
Bosworth Heating Co., plumbing supplies,	6.10
Parks & Savage, crackers,	17.26
Plimpton Mfg. Co., office supplies,	9.35
C. B. Haskell, potatoes,	90.00
Charles Wolcott, milk, eggs, etc.,	24.70
Smith, Northam & Co., feed,	4.71
Hurd, Mellen & Hewes, crockery,	13.65
T. Sisson & Co., drugs, etc.,	165.57
F. J. Coudray, maple syrup,	2.50
McGee Furnace Co., stove linings,	4.00
H. H. Olds & Co., pies,	25.11
A. S. Gale, veterinary surgeon,	2.00
F. H. Leggett & Co., beans,	25.33
R. N. Fitzgerald, beans,	11.25
Blodgett & Clapp Co., iron supplies,	2.53
Russell & Erwin Mfg. Co., keys,	.49
Southern N. E. Telephone Co.,	27.00
Mansuy Carriage Co., repairs,	20.60
W. G. Simmons & Co., shoes,	4.50
W. H. Scheiffelin & Co., drugs,	5.60
W. B. Bassett, organist,	25.00
Hartford Coal Co.,	1,875.56
Newton & Burnett, meats and vegetables,	961.66
Foster & Co.,	42.74
The Great Atlantic & Pacific Tea Co.,	24.75
E. H. Judd & Son,	11.75
Stephen Morgan,	4.75
Way & Co.,	2.43
M. P. Southworth, wood,	7.50
R. D. Hawley & Co., hardware,	3.21
Seth Belden & Son, lime,	2.25
	$3,832.63

CREDIT FOR JULY, 1893.

GEORGE HAVEN, *Warden.*

By cash received from Geo. Haven, Warden, on August 1, 1893,	$2,738.59
By cash received from T. Sisson & Co., error in May account, paid twice,	128.52
By cash from J. L. Woodbridge, Warden,	965.52
	$3,832.63

CERTIFICATE OF AUDITORS.

This certifies that we have examined the accounts of the Connecticut State Prison, from October 1, 1892, to the appointment of Jabez L. Woodbridge as warden, August 1, 1893. The books show a balance of two thousand eight hundred and thirty-five dollars and seventy-two cents ($2,835.72). We find that there should be added to said balance, errors in excess of vouchers presented, as follows: In April, nine cents ($.09); in May, four dollars ($4.00); and in July, one hundred dollars ($100), showing that the balance should have been two thousand nine hundred and thirty-nine dollars and eighty-one cents ($2,939.81). The sum of two thousand seven hundred and thirty-eight dollars and fifty-nine cents ($2,738.59) was paid to Warden Woodbridge, August 1, 1893, which shows a deficiency of two hundred and one dollars and twenty-two cents ($201.22). The books were kept by a prisoner and in a very primitive manner.

E. LIVINGSTON WELLS,
OSCAR LEACH,
Auditors of Public Accounts.

PROFIT AND LOSS ACCOUNT.

From August 1, 1893, to September 30, 1894.

JABEZ L. WOODBRIDGE, *Warden.*

To	cash paid for prison supplies, bills for the month of July, 1893, in excess of cash paid over by George Haven, Warden,	$965.52
To	Salaries,	22,496.82
	Prison and hospital provisions,	13,055.62
	Light, fuel, and water,	10,261.72
	Clothing and bedding,	3,739.69
	Medicine,	945.82
	Tobacco,	396.60
	Expense account,	3,778.84
	Library,	97.81
	Prison supplies,	2,349.83
	Furnishing warden's house,	1,768.57
	Furniture, officers' quarters,	561.32
	Chapel,	411.05
	Furnishing hospital,	72.00
	Advertising account,	40.35
	Amusement "	11.00
	Farm "	69.23
	Night school,	45.18
	Transportation of convicts to and from insane retreat,	28.00
	Furnishing directors' room,	391.62
	Execution house,	3,627.11
	Provisions for furnishing officers' and warden's table and paid help,	6,844.82
	Warden's supplies,	321.68
	Uniform,	63.11
	Insurance,	240.81
	Improvements and repairs,	21,353.44
		$93,937.56

Credit.

By	Stock,	$23,624.90
	Motive power,	1,682.96
	Sale account,	377.97
	Visitors' receipts,	1,270.90
	Convict labor,	38,755.26
	Rent account,	221.33
	Laundry account,	22.50
	Fine account,	35.00
	Court fines,	2.00
	State of Connecticut to balance,	27,944.74
		$93,937.56

RECEIPTS AND EXPENDITURES.

Summary.

Received of Comptroller from August 1, 1893, to September 30, 1894,	$54,402.86	
Excess of accounts payable over accounts receivable September 30, 1894,	626.12—	$55,028.98

Per Contra.

Increase of inventory from June 30, 1893, to September 30, 1894,	$26,051.65	
Cash on hand September 30, 1894,	1,032.59—	27,084.24
Balance to profit and loss account,		$27,944.74

SALE ACCOUNT.

1893.			
Aug.	12.	107 empty barrels,	$17.92
	17.	10 lbs. old iron,	.10
	30.	3,181 lbs. grease,	95.43
Sept.	9.	62 empty barrels,	10.13
	12.	6 large window sash,	3.40
	27.	1 set second-hand scales,	5.00
	28.	2,000 old brick,	7.00
	29.	141 lbs. scrap brass, 438 lbs. tea-lead,	13.29
Oct.	12.	4,000 lbs. old iron,	8.00
	16.	Old iron,	5.00
		200 old brick,	.70
	31.	600 old brick,	1.75
Nov.	1.	Old stove,	1.00
	20.	Empty hogshead,	1.25
Dec.	5.	108 empty barrels,	18.00
1894.			
Jan.	23.	Old iron,	7.78
Mar.	13.	Old iron,	5.88
April	20.	3 pair sash,	.75
		Old gas tank,	44.37
May	1.	3 pair sash,	.75
	21.	4,030 lbs. bones, 1,086 lbs. grease,	63.59
June	7.	Rent of 'bus,	3.50
	12.	Old iron,	6.45
Sept.	15.	12 flour barrels,	2.00
	30.	2,570 lbs. bones,	10.28
		1 kettle,	3.40
		240 barrels,	40.00
		1 hogshead,	1.25
			$377.97

INVENTORY, SEPTEMBER 30, 1894.

Real estate, comprising State Prison buildings, warden's house, Welles house, deputy's house, barns and outbuildings, with about 24 acres of land, at	$362,985.00	
Engines and boilers,	4,098.00	
Steam plant,	3,900.00	
Gas plant,	1,775.00	
Generator,	350.00	
Personal property,	27,116.25—	$400,224.25

SIMEON HALE,
E. G. WOODHOUSE, } *Appraisers under oath.*

WETHERSFIELD, Oct. 17, 1894.

Sworn to before me, this 17th day of October, 1894.

H. KIRK WOODBRIDGE,
Notary Public.

Inventory, June 30, 1893.

Real estate, comprising State Prison, buildings, warden's house, Welles house, deputy's house, barns and outbuildings, with about 24 acres of land, at	$347,000.00	
Steam plant,	3,700.00	
Personal property,	23,472.60—	$374,172.60
Increase of inventory from June 30, 1893, to Sept. 30, 1894,		$26,051.65

SIMEON HALE,
E. G. WOODHOUSE, } *Appraisers under oath.*

WETHERSFIELD, July 7, 1894.

Sworn to before me, this 7th day of July, 1864.

H. KIRK WOODBRIDGE,
Notary Public.

CERTIFICATES OF AUDITORS.

This certifies that we have examined the accounts of Jabez L. Woodbridge, Warden of the Connecticut State Prison, from August 1, 1893, to September 30, 1893, inclusive, and compared them with the vouchers and find the same correct, showing a balance on September 30, 1893, the end of the fiscal year, amounting to the sum of one thousand six hundred and seventy-six dollars and ninety-five cents ($1,676.95).

E. LIVINGSTON WELLS,
OSCAR LEACH,
Auditors of Public Accounts.

December 19, 1893.

WARDEN'S OFFICE,

CONNECTICUT STATE PRISON,
WETHERSFIELD, NOV. 22, 1894.

This certifies that we have examined the accounts of Jabez L. Woodbridge, Warden of the Connecticut State Prison, from October 1, 1893, to September 30, 1894, inclusive, the end of the fiscal year, and compared them with the vouchers and find them correct, showing a balance on hand on September 30, 1894, amounting to the sum of one thousand and thirty-two dollars and fifty-nine cents ($1,032.59).

We are pleased to state that the vouchers and books, for the past fourteen months, have been kept in a thorough business-like manner.

OSCAR LEACH,
E. LIVINGSTON WELLS,
Auditors of Public Accounts.

PER DIEM MAINTENANCE.

Cost per Capita of Prisoners in Confinement from August 1, 1893, to September 30, 1894.

Salaries,		$22,496.82—	.1525
Prison and hospital provisions,	$13,055.62		
Less inventory,	2,278.85—	$10,776.77—	.0730
Light, fuel, and water,	10,261.72		
Less inventory,	3,492.30—	6,769.42—	.0459
Clothing and bedding,	3,739.69		
Less inventory,	2,718.50—	1,021.19—	.0069
Medicine,	945.82		
Less inventory,	350.00—	595.82—	.0040
Tobacco,	396.60		
Less inventory,	30.00—	336.60—	.0024
Total,			.2847

Average number of prisoners per month, $351\frac{1}{14}$.

Cost Per Capita of Warden's Family, Officers, and Paid Help from August 1, 1893, to September 30, 1894, at an average of $30\frac{8}{7}$ *persons per month.*

Total cost of provisions,	$6,844.82
Less inventory,	254.20
	$6,590.62

Cost *per capita* per day, .5085.

STATISTICAL TABLES.

ROSTER OF CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894.

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Remarks.
Allen, George,	33	50	Farmer,	Connecticut,	Bridgeport,	Sept. 7, 1877,	Murder, 2d degree,	Life.	
Alexander, Lorena,	44	60	Housewife,	New York,	Bridgeport,	Nov. 8, 1878,	Murder, 2d degree,	Life.	
Albrecht, Walter,	26	28	Butcher,	Germany,	Hartford,	Sept. 16, 1892,	Rape,	Life.	
Aldpost, Thomas,	40	41	Sailor,	England,	Bridgeport,	Sept. 13, 1893,	Theft of boat,	1½ yrs.	
Albig, Charles W.,	32	33	Laborer,	Connecticut,	New Haven,	Oct. 25, 1893,	Rape,	6 years.	
Allen, Ernest,	22	22	Waiter,	Connecticut,	Bridgeport,	Mch. 7, 1894,	Burglary,	2 years.	
Anderson, Charles,	26	26	Sailor,	Sweden,	N. London,	Jan. 12, 1894,	Theft,	3 years.	
Arnold, William,	18	19	Laundryman,	R. Island,	Putnam,	Sept. 5, 1893,	Theft,	1½ yrs.	
Ashley, William,	27	27	Engraver,	Mass.,	New Haven,	April 3, 1894,	Statu. burglary,	1½ yrs.	*Alias* Joseph Burke.
Atwood, Morris,	53	53	Farmer,	Connecticut,	New Haven,	July 3, 1894,	Arson,	7 years.	Sent to Ins. Hosp.
Avon, Joseph,	21	23	Machinist,	R. Island,	N. London,	Sept. 20, 1892,	Burglary,	4 years.	July 15, 1893; ret.
Bassett, Frank,	24	39	Laborer,	Connecticut,	Bridgeport,	Mch. 1, 1879,	Murder, 2d degree,	Life.	pris. Apr. 23, 1894.
Battis, George,	33	35	Wheelwright,	Switzerland,	New Haven,	April 14, 1892,	Manslaughter,	10 yrs.	$1 fine.
Batterson, John,	29	31	Farmer,	Connecticut,	Bridgeport,	Feb. 24, 1893,	Arson,	2½ yrs.	
Baldwin, Ernest,	19	21	Farmer,	Connecticut,	Bridgeport,	May 10, 1893,	Assault, int. rape,	2 years.	Negro.
Baker, George,	38	40	Hatter,	Connecticut,	Hartford,	June 6, 1893,	Statu. burglary,	4 years.	3 indictments, 2, 1, 1.
Bascom, Napoleon,	33	35	Grainer,	New York,	Hartford,	June 6, 1893,	Theft,	3 years.	
Balcom, Frank,	21	23	Brakeman,	R. Island,	N. London,	Sept. 15, 1893,	Burglary,	1½ yrs.	
Bassett, David,	26	26	Blacksmith,	Connecticut,	Bridgeport,	Mch. 2, 1894,	Horse stealing,	2 years.	
Banks, Edward,	40	40	Farmer,	Virginia,	Bridgeport,	Sept. 13, 1894,	Assault, int. rape,	1 year.	Negro.
Bellware, Hazen,	45	49	Laborer,	Canada,	Hartford,	Dec. 19, 1890,	Murder, 2d degree,	Life.	
Benham, W. G.,	54	56	Bookbinder,	Connecticut,	New Haven,	July 6, 1892,	Burglary,	3 years.	
Bell, Peter C.,	57	58	Farmer,	Connecticut,	Hartford,	Dec. 7, 1893,	Statutory arson,	2 years.	
Bender, Connie,	18	18	Errand boy,	Russia,	Danbury,	May 9, 1894,	Burglary,	2 years.	
Bishop, Wesley W.,	33	48	Druggist,	Connecticut,	Norwich,	May 20, 1879,	Murder, 2d degree,	Life.	
Bloeser, John W.,	26	33	Barber,	Pa.,	Norwich,	Jan. 5, 1887,	Arson,	10 yrs.	
Bloeser, Henry J.,	47	54	Upholsterer,	Germany,	Norwich,	Jan. 5, 1887,	Arson,	10 yrs.	
Booth, John,	44	45	Fireman,	Mass.,	New Haven,	April 25, 1893,	Burglary,	3 years.	
Bradley, George,	24	29	Laborer,	Connecticut,	Hartford,	June 5, 1889,	Murder, 2d degree,	Life.	

Brown, Joseph (2),	31	34	Barber,	Pa.,	Bridgeport,	Sept.	9, 1891.	Burglary,	7 years.	3 indictments, 5, 1, 1.
Brooks, Harry W.,	18	20	Ship. Clerk,	Connecticut,	New Haven,	Oct.	20, 1892,	Burglary,	3 years.	
Breen, John,	19	20	Shirt-maker,	Mass.,	Bridgeport,	Sept.	15, 1893,	Burglary,	1½ yrs.	
Brown, Reuben R.,	61	61	Farmer,	Connecticut,	N. London,	Jan.	5, 1894,	Assault, int. mur.,	10 yrs.	
Brick, Louise,	25	25	Housewife,	New York,	Waterbury,	Feb.	21, 1894,	Adultery,	1 year.	
Brown, Charles,	25	25	Farmer,	Maine,	Hartford,	June	6, 1894,	Cruelty to animals,	1 year.	
Buckholtz, William,	25	39	Bookkeeper,	Germany,	Bridgeport,	June	1, 1880,	Murder, 2d degree,	Life.	Sent Ins. Hosp. April 13, '94; ret'd prison Sept. 19, 1894.
Burns, John,	26	29	Stamper,	Pa.,	Waterbury,	April	28, 1891,	Assault, int. rape,	5 years.	
Burnham, William H.,	41	43	Butcher,	Connecticut,	New Haven,	Oct.	12, 1892,	Rape,	5 years.	
Burke, Joseph,	23	24	Shoe Cutter,	Germany,	New Haven,	Oct.	4, 1893,	Forgery,	2 years.	
Butler, John,	25	25	Farmer,	Connecticut,	N. London,	Jan.	2, 1894,	Theft from person,	2 years.	2 commitments.
Burr, Herbert,	23	23	Electrician,	Connecticut,	Bridgeport,	Mch.	2, 1894,	Horse stealing,	2 years.	
Burns, John (2),	33	33	Laborer,	Connecticut,	Bridgeport,	Feb.	20, 1894,	Theft from person,	2 years.	
Burke, Edward,	29	29	Polisher,	California,	Hartford,	June	12, 1894,	Assault, int. kill,	12 yrs.	
Casey, Thomas,	21	23	Box-maker,	Louisiana,	Hartford,	June	7, 1892,	Statu. burglary,	3 years.	2 indicts., 18 mos. each.
Carlin, Charles,	18	18	Waiter,	Mass.,	New Haven,	April	28, 1894,	Statu. burglary,	1½ yrs.	Com. aft. jail sentence.
Carroll, James,	29	29	Laborer,	Connecticut,	New Haven,	April	3, 1894,	Statu. burglary,	1½ yrs.	Of Charleston Indians.
Caples, Wallace,	19	19	Painter,	Connecticut,	Windham,	May	23, 1894,	Burglary,	3 years.	Negro.
Chamberlain, H. B.,	22	29	Clerk,	Connecticut,	New Haven,	July	18, 1887,	Murder, 2d degree,	Life.	
Chesebro, Joseph,	48	49	Hatter,	Connecticut,	Middletown,	April	5, 1893,	Burning barn,	5 years.	Negro, 2d commitment.
Charcoit, Clinton,	17	18	Grinder,	Connecticut,	Putnam,	Sept.	5, 1893,	Theft,	1½ yrs.	
Clyde, Walter,	36	40	Barber,	Cuba,	Bridgeport,	Sept.	10, 1890,	Burglary,	6 years.	Negro.
Clark, William,	22	23	Laborer,	New Jersey,	N. London,	Sept.	5, 1893,	Burglary,	2½ yrs.	
Clune, Martin,	26	27	Steel polisher,	New York,	Haddam,	Sept.	27, 1893,	Statu. burglary,	2½ yrs.	
Clark, Charles,	40	40	Tool-maker,	Connecticut,	Bridgeport,	March	2, 1894,	Rape,	20 yrs.	
Clemens, Samuel,	20	20	Farmer,	Connecticut,	Putnam,	Sept.	4, 1894,	Horse stealing,	2 years.	
Cobb, Kate,	31	46	Housewife,	Connecticut,	Norwich,	Jan.	17, 1879,	Murder, 2d degree,	Life.	
Conant, Frank V.,	34	44	Salesman,	Mass.,	N. London,	Oct.	15, 1884,	Murder, 2d degree,	Life.	
Coyle, Richard,	58	66	Cloth finisher,	Ireland,	Norwich,	May	4, 1886,	Murder, 2d degree,	Life.	
Coleman, James,	32	33	Gardener,	Ireland,	Norwich,	Jan.	3, 1893,	Burglary,	2½ yrs.	
Connors, Patrick,	19	20	Polisher,	New York,	New Haven,	April	4, 1893,	Statu. burglary,	2 years.	
Coffey, Michael,	26	27	Laborer,	Connecticut,	New Haven,	April	19, 1893,	Statu. burglary,	2 years.	
Cook, Edward M.,	33	34	Shoemaker,	Connecticut,	Litchfield,	Oct.	13, 1893,	Incest,	2 years.	
Corbett, Joseph,	29	29	Quarryman,	Mass.,	Bridgeport,	March	2, 1894,	Burglary,	15 yrs.	
Convery, James,	22	22	Laborer,	Connecticut,	Bridgeport,	Feb.	28, 1894,	Burglary,	1 year.	
Connors, John,	26	26	Fireman,	Connecticut,	Hartford,	March	7, 1894,	Statu. burglary,	2½ yrs.	

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Remarks.
Costello, James,	28	28	Laborer,	Connecticut,	Tolland,	April 20, 1894,	4 counts burglary,	6½ yrs.	
Coats, William,	40	40	Machinist,	Ireland,	Danbury,	May 9, 1894,	Unlawful cohab'n,	2 years.	
Corbett, James,	27	27	R. R. man,	New York,	Norwich,	June 5, 1894,	Horse stealing,	2 years.	
Coyne, James,	29	29	Laborer,	Connecticut,	Hartford,	June 12, 1894,	Theft from person,	2 years.	
Crandall, Charles,	25	31	Milk peddler,	Indiana,	Middletown,	Dec. 4, 1888,	Rape,	15 yrs.	
Cruise, Patrick,	23	23	Hostler,	Connecticut,	Bridgeport,	Sept. 11, 1894,	Horse theft,	2 years.	
Crossley, Floyde,	33	35	Wood chopper,	Connecticut,	Litchfield,	May 12, 1892,	Manslaughter,	3 years.	Negro, $100 fine.
Crawford, Charles,	32	32	Mar. fireman,	New York,	Danbury,	May 23, 1894,	Burglary,	2 years.	
Cronnen, John,	52	52	Laborer,	Connecticut,	Hartford,	Sept. 11, 1894,	Assault, int. mur.,	18 yrs.	5th commitment.
Curtis, George E.,	26	27	Reporter,	Illinois,	Bridgeport,	Sept. 21, 1893,	Horse theft,	3½ yrs.	
Curley, John,	32	33	Groom,	Pa.,	Hartford,	Dec. 12, 1893,	Statu. burg., theft,	2½ yrs.	
Cunningham, John,	33	33	Iron molder,	Mass.,	New Haven,	Jan. 24, 1894,	Statu. burglary,	1½ yrs.	
Cummings, Stephen,	26	26	Laborer,	Connecticut,	New Haven,	Feb. 2, 1894,	Theft from person,	15 mos.	
Cunningham, Jno. (2),	30	30	Polisher,	Connecticut,	Waterbury,	Feb. 21, 1894,	Burglary,	2 years.	
Curry, James,	27	28	Har. maker,	Connecticut,	Hartford,	Dec. 8, 1893,	Statu. burglary,	3 years.	2d commitment.
Davis, John H.,	27	42	Laborer,	Mass.,	Hartford,	April 3, 1879,	Murder, 2d degree,	Life.	
Daley, Mary,	45	47	Housewife,	Ireland,	Windham,	Jan. 20, 1892,	Murder, 2d degree,	Life.	
Daley, Patrick, Jr.,	20	20	Buffer,	Connecticut,	New Haven,	Jan. 4, 1894,	Statu. burglary,	1 year.	
Davis, Peter,	25	25	Laborer,	Velno, Rus.,	New Haven,	Jan. 5, 1894,	Theft,	1½ yrs.	
Daniels, Charles,	34	34	Mason,	Connecticut,	Norwich,	May 9, 1894,	Burglary,	1½ yrs.	
Daniels, William,	31	31	Blacksmith,	Connecticut,	Norwich,	May 9, 1894,	Burglary,	1½ yrs.	
Daley, William,	21	21	Laborer,	Russia,	Hartford,	Sept. 12, 1894,	Horse theft,	10 yrs.	2 inds., 4, 6; Russian name Dolinski.
Darl, Frank,	19	19	Bookkeeper,	Connecticut,	Danbury,	May 9, 1894,	Horse theft,	2 years.	
Derick, William,	21	23	Farmer,	Virginia,	New Haven,	Oct. 13, 1893,	Assault, intent kill,	5 years.	Negro.
Dimlow, Henry,	24	27	Laborer,	Connecticut,	Hartford,	Dec. 8, 1891,	Statu. burglary,	4 years.	2d commitment.
Dillon, John,	21	23	Laborer,	Ireland,	Hartford,	Sept. 16, 1892,	Rape,	Life.	
Dimon, Leonard,	28	29	R. R. man,	Canada,	Putnam,	Dec. 20, 1893,	Burglary,	1 year.	
Dixon, Richard,	38	38	Lithographer,	Connecticut,	Hartford,	Sept. 11, 1894,	Burglary,	5 years.	*Alias* Ed. Rider, 2d com.
Doe, John,	25	33	Farmer,	Mass.,	Bridgeport,	Sept. 14, 1886,	Burglary,	16 yrs.	2 indictments, 8, 8.

Dougherty, Andrew,	30	30	Steam fitter,	Connecticut,	Bridgeport,	Feb.	21, 1894,	Theft, burglary,	2¼ yrs.	2 sents., 1 yr. & 15 mos.
Dougherty, John,	52	52	Laborer,	Ireland,	Bridgeport,	Feb.	28, 1894,	Theft,	2 years.	
Dorris, John,	32	32	Laborer,	New York,	Hartford,	June	5, 1894,	Theft from person,	4 years.	
Donovan, Michael,	46	46	Laborer,	Connecticut,	Norwich,	June	5, 1894,	Murder, 2d degree,	Life.	
Driggs, George D.,	47	48	Hostler,	Connecticut,	Litchfield,	Oct.	19, 1893,	Assault, int. kill,	2 years.	2d commitment.
4 Driggs, Ernest,	18	18	Farmer,	Connecticut,	Hartford,	June	5, 1894,	Burglary,	7 years.	
Dunn, Thomas (1),	59	63	Gardener,	Ireland,	Bridgeport,	June	5, 1890,	Manslaughter,	7 years.	
Duprey, Joseph,	20	21	Timber cutter,	Pa.,	Middletown,	April	4, 1893,	Burglary,	15 yrs.	4 indictments, 5, 5, 4, 1.
Dunn, Thomas (2),	37	37	Laborer,	Connecticut,	Litchfield,	April	10, 1894,	Burglary,	1½ yrs.	2d commitment.
Dumpson, Oscar,	17	17	Boxbuilder,	Ohio,	New Haven,	July	9, 1894,	Plac. ob. on R. R.	6 years.	Negro.
Dynes, John,	19	20	Shoemaker,	Connecticut,	Hartford,	Sept.	23, 1893,	Murder, 2d degree,	Life.	Ret. fr. Mid'n No. 28, '92.
Edmunds, Charles P.,	39	40	Farmer,	Connecticut,	New Haven,	Oct.	6, 1893,	Statu. burglary,	2½ yrs.	Negro—At. sui. Mar. 23, '83, I. H. Nov. 17, '93; ret. Ap. 23, '94.
Ellis, Jefferson,	34	49	Sailor,	New York,	Haddam,	Dec.	12, 1879,	Murder, 2d degree,	Life.	
Enright, Patrick,	22	27	Blacksmith,	Connecticut,	Bridgeport,	Oct.	17, 1889,	Rape,	10 yrs.	
Eno, Lewis,	35	37	Laborer,	Canada,	Putnam,	May	3, 1892,	Assault int. murd.,	10 yrs.	Sent Ins. Hosp. Nov. 17, 1893; ret. prison Sept. 19, '94.
Enwright, Thomas,	30	30	Brass polisher,	Connecticut,	Danbury,	May	23, 1894,	Burglary,	2 years.	
Eagan, James M.,	22	23	Painter,	Connecticut,	Hartford,	Dec.	6, 1893,	Statu. burglary,	3 years.	
Estrom, Peter,	22	25	Laborer,	Finland,	New Haven,	Oct.	13, 1891,	Manslaughter,	7 years.	
Fanning, Joseph,	28	31	Laborer,	Connecticut,	New Haven,	Oct.	20, 1891,	Theft from person,	7½ yrs.	3d commitment.
Fanning, William,	27	29	Blacksmith,	Connecticut,	New Haven,	Oct.	4, 1892,	Robbery,	4 years.	2d commitment.
Farley, Peter,	23	24	Bartender,	New York,	Hartford,	Sept.	12, 1893,	Theft from person,	4 years.	Farley *alias* Curtiss.
Feeney, Martin,	37	44	Rubber cutter,	Vermont,	Waterbury,	Nov.	1, 1887,	Murder, 2d degree,	Life.	
Ferrari, Vettorio,	26	27	Laborer,	Italy,	New Haven,	Sept.	19, 1893,	Pass. c'tfeit mon'y,	7 years.	$1, Sent. U. S. Dist. Ct.
Fisk, George,	29	30	Pressman,	Connecticut,	Hartford,	June	8, 1893,	Assault, int. to kill,	14 yrs.	
Fisher, Paul,	25	26	Laborer,	Germany,	Bridgeport,	Oct.	18, 1893,	Forgery,	14 mos.	
Fisher, Charles,	22	23	Ship caulker,	N. Carolina,	New Haven,	Jan.	24, 1893,	Statu. burglary,	1½ yrs.	Negro.
Fitzgerald, Thomas,	28	28	Fireman,	Ireland,	Bridgeport,	Feb.	22, 1894,	Theft from person,	15 mos.	
Fitzgerald, Michael,	22	22	Buffer,	Connecticut,	Waterbury,	Feb.	20, 1894,	Burglary,	4 years.	Negro — Sent to Ins. Hosp. July 15, '93; ret. Nov. 17, '93; *alias* Alonzo Johnson; 2d commit.
Finklestein, Jacob,	23	23	Expressman,	New York,	Hartford,	Mch.	13, 1894,	Horse stealing,	6 years.	
Fleetman, Philip,	26	26	Barber,	Germany,	Bridgeport,	Feb.	21, 1894,	Theft,	1 year.	
Ford, Patrick,	26	29	Laborer,	Connecticut,	New Haven,	Oct.	13, 1891,	Horse stealing,	5 years.	
Freeman, Alonzo,	34	44	Teamster,	Virginia,	Litchfield,	April	9, 1884,	Attempted rape,	20 yrs.	
Freeman, Amos,	33	34	Painter,	Connecticut,	New Haven,	Jan.	3, 1893,	Burglary,	4 years.	Negro.
Franklin, Curlo,	25	26	Shoemaker,	Italy,	New Haven,	Jan.	11, 1893,	Assault, intent kill,	2 years.	
Freeman, George,	30	31	Hostler,	Connecticut,	Hartford,	Mch.	7, 1893,	Theft,	3 years	Negro; 2d commitment.
Frost, Henry,	45	45	Farmer,	Denmark,	Tolland,	June	5, 1894,	Theft,	3 years.	

ROSTER OF CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894. — *Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where committed.	When committed.	Crime.	Sentence.	Remarks.
Fuller, Clifford,	18	20	Farmer,	Connecticut,	Haddam,	Sept. 27, 1892,	Robbery,	7 years.	Esc'd Oct. 26, '68; re-c'p'd May 1, '69; sent to Ins. Hosp. Sept. 10, '74; ret'd to pris. Oct. 17, '74.
Furtmiller, Albert,	22	22	Baker,	Germany,	New Haven,	April 3, 1894,	Theft,	2 years.	
Gaynuch, Anauci,	34	34	Fruit dealer,	Italy,	Danbury,	May 10, 1894,	Pas. c'terfeit coin,	2 years.	
Gilbert, Charles E.,	25	54	Printer,	Connecticut,	Hartford,	May 4, 1865,	Murder, 2d degree,	Life.	
Gillepsie, John,	35	48	Laborer,	Maryland,	Hartford,	Dec. 8, 1881,	Burglary,	15 yrs.	2 indictments, 10 and 5.
Gong, Charles,	19	22	Laundryman,	China,	Hartford,	Sept. 9, 1891,	Murder, 2d degree,	Life.	*Alias* Coon, and Goon.
Gorman, Martin,	31	32	Laborer,	Connecticut,	Hartford,	Dec. 12, 1893,	Statu. burglary,	3 years.	3d commitment.
Graves, Oscar,	18	39	Car'ge painter,	Connecticut,	Hartford,	Sept. 23, 1873,	Murder, 2d degree,	Life.	Esc. June 27, '87; ret. 28.
Graham, Archibald,	66	73	M'ket gard'n'r,	Scotland,	Norwich,	Jan. 5, 1887,	Arson,	10 yrs.	
Green, Charles,	25	29	Carpet layer,	New York,	Bridgeport,	Feb. 25, 1890,	Rape,	15 yrs.	Negro.
Green, John,	38	40	Brick mason,	New York,	Danbury,	Nov. 17, 1892,	Burglary,	2½ yrs.	
Graham, Lawrence P.,	19	20	Actor,	D. C.,	Putnam,	Sept. 5, 1893,	Forgery,	2½ yrs.	2 indictments, 1 and 1½.
Green, Hiram,	43	44	Carpenter,	Connecticut,	New Haven,	Sept. 19, 1893,	Burglary,	5 years.	U. S. Prisoner.
Grey, Lewis,	23	24	Farmer,	Connecticut,	New Haven,	Oct. 3, 1893,	Horse stealing,	4 years.	2 indictments, 2 and 2.
Graham, John,	23	24	Shoemaker,	Maine,	Hartford,	Dec. 5, 1893,	Statu. burglary,	3½ yrs.	
Guthrie, John,	23	23	Shoemaker,	Ireland,	New Haven,	Jan. 18, 1894,	Statu. burglary,	1½ yrs.	2d commitment.
Gtowiski, John,	24	24	Dyer,	Germany,	Tolland,	April 20, 1894,	Forgery,	1¼ yrs.	
Hawley, John,	30	56	Laborer,	Connecticut,	Danbury,	Oct. 21, 1868,	Rape,	Life.	Negro. [G. A.
Hall, Frederick,	32	55	Laborer,	Mass.,	Litchfield,	July 19, 1871,	Murder, 1st degree.	Life.	Negro; sent. hung; com.
Hauerwas, Henry,	30	41	Butcher,	Connecticut,	Tolland,	Sept. 12, 1883,	Burglary, etc.,	13 yrs.	2 indictments, 10, 3.
Hayes, Daniel,	22	28	Laborer,	New York,	Hartford,	Sept. 19, 1888,	Rape,	15 yrs.	
Hanley, James,	26	28	Laborer,	Connecticut,	Litchfield,	May 12, 1892,	Murder, 2d degree,	Life.	
Harrington, John,	27	29	Polisher,	Connecticut,	Hartford,	June 7, 1892,	Theft,	3 years.	2d com., 3d offense.
Hawley, John (2),	39	41	Janitor,	Connecticut,	Bridgeport,	Oct. 7, 1892,	Murder, 2d degree,	Life.	Negro; recom. June 9, '93, for life.
Harney, Michael,	30	31	Laborer,	Connecticut,	New Haven,	April 14, 1893,	Arson,	4 years.	
Hart, Thomas,	24	25	Tailor,	Mass.,	New Haven,	July 5, 1893,	Burglary,	5 years.	
Hall, Thomas,	36	37	Hatter,	Connecticut,	Bridgeport,	Sept. 12, 1893,	Robbery,	4 years.	
Hanson, Samuel,	19	20	Laborer,	Connecticut,	Hartford,	Dec. 5, 1893,	Statu. burglary,	1 year.	
Harrison, Patrick,	24	24	Molder,	Connecticut,	Bridgeport,	Feb. 21, 1894,	Burglary,	1 year.	

Haney, William,	38	38	Hostler,	Connecticut,	Waterbury,	Feb.	21, 1894,	Adultery,	1 year.	
Hawley, Florence,	32	35	Housewife,	Connecticut,	Bridgeport,	Mch.	22, 1891,	Manslaughter,	9 years.	Negro, $1 fine.
Hanson, Hans,	18	18	Kitchen hand,	Connecticut,	Hartford,	June	5, 1894,	Statu. burglary,	1 year.	
Hauser, Frank,	22	22	Clerk,	New York,	New Haven,	July	6, 1894,	Horse stealing,	2 years.	
Hayden, George,	38	38	Carpenter,	Connecticut,	New Haven,	July	6, 1894,	Statu. burglary,	2½ yrs.	
Harwood, Frank,	30	30	Cook,	New York,	Putnam,	Sept.	12, 1894,	Burglary,	3 years.	Negro.
Hewlett, Francis R.	20	20	Farmer,	Connecticut,	N. London,	Jan.	17, 1894,	Rape,	4 years.	
Henry, William,	23	23	Lawyer,	New York,	Bridgeport,	Mch.	2, 1894,	Burglary,	15 yrs.	
Hewlett, Henry A.,	19	19	Farmer,	Connecticut,	N. London,	Jan.	17, 1894,	Rape,	4 years.	
Hennessey, Michael,	65	65	Farmer,	Ireland,	Litchfield,	May	10, 1894,	Manslaughter,	10 yrs.	$1 fine.
Hennessey, Mich'l (2),	39	39	Teamster,	Connecticut,	Hartford,	Sept.	11, 1894,	Theft from person,	1½ yrs.	
Hine, James A.,	36	38	Farmer,	Connecticut,	New Haven,	Jan.	15, 1892,	Manslaughter,	7 years	
Hines, John,	33	35	Barber,	Mass.,	Hartford,	Dec.	7, 1892,	Theft from person,	2½ yrs.	
Higgins, John F.,	19	20	Laborer,	Connecticut,	New Haven,	July	5, 1893,	Statu. burglary,	1½ yrs.	
Hitchcock, Dwight,	49	49	Cook,	Connecticut,	New Haven,	Jan.	17, 1894,	Bigamy,	1½ yrs.	
Hill, Joseph,	34	34	Dyer,	Germany,	Hartford,	Sept.	13, 1894,	Theft,	4 years.	
Hotchkiss, Henry S.,	40	47	Musician,	Connecticut,	Hartford,	Mch.	3, 1887,	Murder, 2d degree,	Life.	
Hoffman, Joseph,	22	23	Brass finisher,	New York,	New Haven,	Oct.	3, 1893,	Statu. burglary,	2 years.	
Holloway, Ezra,	48	48	Carpenter,	Connecticut,	N. London,	Jan.	12, 1894,	Theft,	3 years.	2d commitment.
Horton, Edward,	26	26	Hatter,	Connecticut,	Bridgeport,	Feb.	22, 1894,	Theft from person,	1 year.	
Howard, Charles,	19	19	Laborer,	Connecticut,	Windham,	May	9, 1894,	Burglary,	3 years.	Negro.
Hutchinson, Fred'k,	28	30	Farmer,	Nova Scotia,	Hartford,	Dec.	6, 1892,	Horse stealing,	7 years.	2 indicts., 3½ and 3½.
Hurly, Patrick,	29	29	Laborer,	Connecticut,	New Haven,	July	5, 1894,	Abusing child,	3 years.	
Hyter, Gilbert,	29	32	Laborer,	New York,	Litchfield,	April	21, 1891,	Horse stealing,	5 years.	
Ivers, George,	42	44	Engraver,	Connecticut,	Hartford,	Dec.	6, 1892,	Theft from person,	2½ yrs.	
Jackson, Arthur,	33	37	Laborer,	Mass.,	Hartford,	Sept.	9, 1890,	Assault, int. mur.,	12 yrs.	Negro.
Jaycock, George,	30	33	Farmer,	New York,	Bridgeport,	Sept.	8, 1891,	Horse theft,	4 years.	Negro; *alias* Lawrence.
Jamieson, Robert W.,	39	39	Cigar-maker,	Connecticut,	New Haven,	Jan.	18, 1894,	Assault, int. kill,	2 years.	
Jaoah, Aredreas,	19	19	Farmer,	Germany,	Bridgeport,	Mch.	7, 1894,	Arson,	4 years.	
Jackson, Henry,	34	34	Cook,	Mississippi,	New Haven,	Sept.	20, 1894,	Statu. burglary,	5 years.	Negro.
Johnson, William,	54	56	Shoemaker,	Connecticut,	Haddam,	Sept.	27, 1892,	Statu. burglary,	4 years.	2 indicts.; 8th com., 2, 2.
Johnson, George,	28	30	Laborer,	Mass.,	Hartford,	Mch.	9, 1892,	Assault, int. kill,	4 years.	Negro; 2 com. for as't Offi. Jones, 4 y. Au. 6, '92; sent I. H., Jy. 15, '93; ret. Nov. 17, '93.
Johnson, Fred. D.,	30	31	Brass buffer,	Connecticut,	Hartford,	Sept.	12, 1893,	Horse stealing,	2 years.	
Kennedy, John P.,	28	37	Cow herder,	Kansas,	N. London,	April	2, 1885,	Murder, 2d degree,	Life.	
Keefe, Andrew,	26	27	Merchant,	New York,	New Haven,	Jan.	19, 1893,	Manslaughter,	3 years.	
Kendrick, Phillip,	23	24	Jack shinner,	Connecticut,	Bridgeport,	Feb.	21, 1893,	Assault, at. rape,	7½ yrs.	

ROSTER OF CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894. — *Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Remarks.
Keegan, Dennis,	25	26	Stone polisher,	Rho. Island,	N. London,	May 12, 1893,	Statu. burglary,	3 years.	
Keena, John,	27	28	Butcher,	Connecticut,	New Haven,	Oct. 24, 1893,	Arson,	8 years.	
Kelly, William,	28	29	Brakeman,	Pa.,	Hartford,	Dec. 5, 1893,	Theft, stat. burg.,	3½ yrs.	
Kerwin, James,	22	23	Laborer,	Connecticut,	Hartford,	Dec. 6, 1893,	Statu. burglary,	3 years.	*Alias* Chas. Williams;
King, William,	33	47	Baker,	Connecticut,	Haddam,	Nov. 10, 1880,	Rape,	25 yrs.	*alias* James Judd;
Kinsman, John T.,	48	50	Laborer,	England,	New Haven,	Oct. 4, 1892,	Statu. burglary,	3 years.	3d commitment.
Kimball, Frank,	22	23	Machinist,	Connecticut,	Bridgeport,	Sept. 29, 1893,	Burglary,	19 mos.	
Lamphre, James M.,	49	51	Printer,	Connecticut,	Middletown,	April 6, 1892,	Robbery,	4 years.	
Lapham, Alfred W.,	18	20	Stenographer,	New York,	New Haven,	April 5, 1892,	Robbery,	7 years.	
Latham, Charles,	20	22	Laborer,	Connecticut,	N. London,	Sept. 27, 1892,	Statu. burglary,	3 years.	
Lahman, Herman M.,	20	21	Carpenter,	Connecticut,	New Haven,	April 4, 1893,	Statu. burglary,	2½ yrs.	
Lawler, Michael,	18	18	Buffer,	Connecticut,	New Haven,	Jan. 17, 1894,	Statu. burglary,	1½ yrs.	
La Freniere, Louis,	35	35	Cigar-maker,	Canada,	New Haven,	Jan. 4, 1894,	Manslaughter,	10 yrs.	
Lawler, Melvina,	29	29	Housewife,	New York,	New Haven,	July 5, 1894,	Adultery,	1 year.	
Ladhoff, John H.,	34	34	Watch-maker,	Germany,	Hartford,	Sept. 12, 1894,	Theft,	2 years.	
Leydon, Robert J.,	54	58	Blacksmith,	Ireland,	Hartford,	Dec. 2, 1890,	Assault, int. rape,	5 years.	
Lenix, Felix,	63	66	Farmer,	Russia,	Hartford,	Mch. 17, 1891,	Statu, burg. arson,	7 years.	*Alias* Alenskoff; 2 in-
Leighton, William,	25	27	Waiter,	Connecticut,	Hartford,	Dec. 7, 1892,	Theft from person,	2½ yrs.	Negro. [dicts., 3, 4.
Lennon, Michael,	23	24	Farmer,	Connecticut,	New Haven,	July 19, 1893,	Statu. burglary,	2 years.	
Leary, Danel,	24	28	Farmer,	Connecticut,	New Haven,	Oct. 7, 1890,	Horse stealing,	5 years.	
Leoine, Frank,	22	23	Farmer,	France,	Putnam,	Sept. 5, 1893,	Theft,	4 years.	
Leary, James,	32	32	Polisher,	Ohio,	Waterbury,	Feb. 21, 1894,	Highway robbery,	4 years.	
Lebutt, Charles,	36	36	Peddler,	Russia,	Hartford,	Mch. 13, 1894,	Horse stealing,	6 years.	
Leuder, James,	23	23	Laborer,	Maine,	Killingly,	May 3, 1894,	Rape,	12 yrs.	
Leary, Arthur,	35	35	Laborer,	Mass'chu'ts,	Norwich,	May 17, 1894,	Theft,	1½ yrs.	
Leban, Joseph,	30	30	Laborer,	Maine,	Hartford,	Sept. 12, 1894,	Theft from person,	1 year.	
Lincoln, William,	18	19	Tel. operator,	Mass'chu'ts,	New Haven,	April 4, 1893,	Statu. burglary,	2 years	
Little, William,	31	31	Printer,	New York,	Hartford,	Sept. 13, 1894,	Theft from person,	3 years.	
Loveland, Otis,	25	27	Blacksmith,	New York,	Danbury,	May 12, 1892,	Burglary,	4 years.	

Luddington, Henry,	38	41	Hatter,	Connecticut,	Bridgeport,	May	28, 1891,	Burglary, etc.,	8 years.	
Lynch, Patrick,	38	55	Laborer,	Ireland,	New Haven,	Oct.	26, 1877,	Murder, 2d degree,	Life.	
Lynes, John,	23	25	Die sinker,	New York,	New Haven,	Oct.	4, 1892,	Horse stealing,	5 years.	
Mackey, John,	34	44	Machinist,	Ireland,	Bridgeport,	Feb.	21, 1884,	As'lt, int. kill, burg.	35 yrs.	2d com.; 3 ind. 15,10,10.
Mackey, Lawrence,	27	37	Farmer,	Ireland,	Bridgeport,	Feb.	21, 1884,	As'lt, int. kill, burg.	35 yrs.	2d com.; 3 ind. 15,10,10.
Martin, Thomas,	32	34	Polisher,	Ireland,	Hartford,	Sept.	13, 1892,	Statu. burglary,	2½ yrs.	2d commitment.
Marshall, John,	57	58	Farmer,	New York,	Bridgeport,	Feb.	23, 1893,	Horse theft,	2 years.	
Martin, John,	18	19	Farmer,	Mass'chu'ts,	New Haven,	July	5, 1893,	Burglary,	3 years.	
Mahoney, James,	19	20	Laborer,	Connecticut,	Bridgeport,	Sept.	13, 1893,	Burglary,	1½ yrs.	
Mavoe, Ferwald,	32	33	Fireman,	France,	Litchfield,	Oct.	19, 1893,	Adultery,	2 years.	
Malidonian, H'mp'tz'n	18	18	Carpenter,	Armenia,	New Lond'n,	Jan'y	5, 1894,	Burglary,	1 year.	
Mason, Isaac,	17	17	Mill hand,	Connecticut,	Danbury,	May	9, 1894,	Burglary,	1 year.	
Mace, Frank,	29	29	Laborer,	New York,	Hartford,	June	12, 1894,	Assault, intent kill,	12 yrs.	
Meloney, Marvin W.	28	30	Fireman,	Connecticut,	Hartford,	Dec.	6, 1892,	Willful inj. signals,	3 years.	$10 fine.
Milo, Napoleon,	22	25	Farmer,	Vermont,	Haddam,	Sept.	23, 1891,	Assault, int. rape,	5 years.	
Miller, Charles H.	45	47	Painter,	Connecticut,	New Haven,	April	26, 1892,	Statu. burglary,	3 years.	2d com.; first time pardoned by General Assembly.
Montario, Manuel,	53	64	Sailor,	Portugal,	Norwich,	Nov.	15, 1883,	Assault, int. mur.,	20 yrs.	2d com.; first time pardoned by General Assembly.
Moran, James,	28	30	Laborer,	Ireland,	New Haven,	Jan'y	5, 1892,	Burglary,	5 years.	2d com.; first time pardoned by General Assembly.
Morris, Carlo,	24	26	Laborer,	Italy,	Hartford,	June	7, 1892,	Statu. burglary,	3 years.	
Moulton, John G.,	30	32	Riding master,	Africa,	Hartford,	Sept.	13, 1892,	Horse stealing,	5 years.	
Moran, Stephen,	31	32	Painter,	Connecticut,	New Haven,	April	4, 1893,	Theft,	2 years.	3d offense.
Moulton, A. J.,	33	34	Farmer,	Mass'chu'ts,	Winchester,	June	21, 1893,	Burglary,	2 years.	
Moran, Thomas,	21	21	Laborer,	Connecticut,	Bridgeport,	Feb.	21, 1894,	Burglary,	1 year.	
Morrisey, David,	19	19	Driver,	Connecticut,	Hartford,	June	13, 1894,	Statu. burglary,	2 years.	
Murphy, John,	23	25	Sailor,	Connecticut,	New Lond'n,	Sept.	20, 1892,	Burglary,	3 years.	
Murphy, Michael,	28	30	Hostler,	Connecticut,	New Haven,	Oct.	18, 1892,	Robbery,	4 years.	2d commitment.
Murphy, Lawrence,	23	24	Hostler,	Virginia,	New Haven,	Jan'y	12, 1893,	Statu. burglary,	2 years.	
Murphy, Thomas,	23	24	Bottler,	Connecticut,	Danbury,	Oct.	19, 1893,	Theft from person,	2 years.	
Murphy, Mark,	31	31	Brass Finisher,	Connecticut,	Hartford,	Sept.	12, 1894,	Forgery,	12 yrs.	*alias* Mark Reilly.
McCarthy, Dennis,	21	22	Painter,	Connecticut,	New Haven,	April	13, 1893,	Statu. burglary,	3 years.	
McCullough, Thomas,	27	27	Lineman,	Ireland,	Bridgeport,	Feb.	21, 1894,	Theft from person,	1 year.	
McCrohan, B'rth'l'm'w	25	25	R. R. man,	New York,	Norwich,	May	17, 1894,	Highway robbery,	7 years.	
McDonald, Charles,	23	24	Waiter,	Connecticut,	Hartford,	Dec.	6, 1893,	Statu. burglary,	3 years.	
McGrath, John,	24	25	Farmer,	Connecticut,	Norwich,	Jan.	26, 1893,	Burning barn,	3½ yrs.	
McGuire, George,	36	37	Farmer,	Connecticut,	New Haven,	April	11, 1893,	Rape,	3 years.	
Nearing, Frank H.,	24	29	R. R. hand,	Connecticut,	Litchfield,	Oct.	11, 1889,	Rape,	12 yrs.	

ROSTER OF CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894. — *Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Remarks.
Nelson, William,	22	22	Hostler,	Connecticut,	Danbury,	May 9, 1894,	Burglary,	2 years.	
Niles, John,	35	35	Mason,	Connecticut,	Putnam,	Sept. 4, 1894,	Adultery,	1 year.	
Nowlin, John,	39	41	Milk peddler,	New York,	Hartford,	June 7, 1892,	Assault,	12 yrs.	12 indict's, 1 yr. each.
Nolan, Francis,	34	35	Cook,	Ireland,	Hartford,	Sept. 12, 1893,	Theft,	4 years.	Sent Ins. Hosp. Nov. 17, '93; ret'd to pris. Sept. 19, '94.
Nolan, Timothy,	27	27	Miller,	Connecticut,	Hartford,	Mch. 6, 1894,	Statu. burglary,	3 years.	
Nyman, John,	27	34	Laborer,	Germany,	Tolland,	Sept. 6, 1887,	Manslaughter,	8½ yrs.	
Nudic, Jacob,	47	50	Farmer,	Russia,	Hartford,	Mch. 17, 1891,	Statu. burg., arson,	7 years.	2 indictments, 3 and 4.
O'Conner, Daniel,	22	22	Rubber maker	Connecticut,	Waterbury,	Feb. 22, 1894,	Attempt rape,	9 years.	
O'Donnell, Jerry,	23	23	Buffer,	Connecticut,	Waterbury,	Feb. 20, 1894,	Burglary,	3 years.	
O'Donnell, Henry,	21	21	Clerk,	Mass.,	New Haven,	July 9, 1894,	Plac'g ob'n R. R.,	6 years.	2d commitm't; sent to Ins. Hosp. Nov. 17, '93; ret'd from Middlet'n Apr. 23, '94.
O'Neil, John,	30	31	Painter,	Connecticut,	Bridgeport,	Feb. 22, 1893,	Burglary,	2 years	
Page, Stephen E.,	38	42	Blacksmith,	R. I.,	Putnam,	Sept. 11, 1890,	Horse stealing,	5 years.	
Padden, John,	28	30	Teamster,	Connecticut,	New Haven,	Jan. 8, 1892,	Burglary,	5 years.	
Papa, Michael,	31	33	Laborer,	Italy,	New Haven,	April 5, 1892,	Assault, int. kill,	3 years.	Negro; 2d com'tm't; formerly as Geo. Parker.
Parker, Samuel,	29	31	Hostler,	D. C.,	Hartford,	Sept. 13, 1892,	Theft,	4 years.	
Palmer, Julius,	33	34	Laborer,	Connecticut,	New Haven,	April 11, 1893,	Arson,	2 years.	
Patrick, Charles,	36	37	Painter,	Connecticut,	Bridgeport,	Sept. 29, 1893,	Burglary,	2 y. 5 m.	
Patrick, William,	32	32	Farmer,	New York,	Danbury,	May 8, 1894,	Attempt rape,	5 years.	
Perkins, Joel W.,	54	77	Carpenter,	Connecticut,	Litchfield,	April 28, 1871,	Murder, 2d degree,	Life.	
Peck, George W.,	34	36	Farmer,	Connecticut,	New Haven,	April 29, 1892,	Statu. burglary,	3½ yrs.	
Peaceclay, Daniel,	34	35	Farmer,	Italy,	New Haven,	Oct. 13, 1893,	Assault, int. kill,	5 years.	
Phyfe, Edward,	21	21	Hostler,	Ireland,	Bridgeport,	Sept. 12, 1894,	Arson,	2 years.	
Pine, Samuel,	24	32	Hatter,	Mass.,	Bridgeport,	Feb. 28, 1886,	Burg., horse steal,	14 yrs.	Negro; 2 indicts, 10, 4.
Plumb, John H.,	28	29	Bicycle insp'r,	Connecticut,	Hartford,	Dec. 12, 1893,	Pas. c'terfeit mon.,	1 year.	$100 fine; 2d com'tm't.
Porter, Charles,	26	28	Plumber,	Connecticut,	New Haven,	April 7, 1892,	Horse stealing,	4 years.	Negro; *alias* Rogers.
Potter, George,	57	59	Farmer,	Connecticut,	Litchfield,	Oct. 14, 1892,	Adultery,	3 years.	
Potsmato, Frank,	45	45	Teamster,	Italy,	New Haven,	April 11, 1894,	Assault, int. kill,	5 years.	*Alias* F. Passamento.
Pond, John D.,	24	24	Steam fitter,	Connecticut,	Hartford,	Sept. 12, 1894,	Theft,	14 mos.	
Quinn, John,	18	21	Mill hand,	Connecticut,	Tolland,	Sept. 1, 1891,	Attempt rape,	13 yrs.	

Rabbitt, Jas. H.,	30	32	Carpenter,	Ireland,	Bridgeport,	Sept.	16, 1892,	Forgery,	3 years.	
Rathborne, Chas. I.,	36	38	Farmer,	Connecticut,	N. London,	Sept.	16, 1892,	Murder, 2d degree,	Life.	
Randall. William,	25	26	Laborer,	Connecticut,	Bridgeport,	Feb.	21, 1893,	Burglary,	4 years.	Negro, 2 and 2.
Reed, William H.,	42	44	Hatter,	New York,	Bridgeport,	Mch.	1, 1892,	Rape,	15 yrs.	*Alias* Clark.
Richwald, Helena,	24	26	Housewife,	Germany,	N. London,	Sept.	16, 1892,	Manslaughter,	4 years.	$1 fine.
Reordon, Patrick	39	40	Laborer,	Ireland,	New Haven,	Oct.	5, 1893,	Theft,	3 years.	Third offense; 2d com.
Reynolds, James,	21	21	Buffer,	Maryland,	Waterbury,	Feb.	20, 1894,	Burglary,	2 years.	
Reicciardella, Mauro,	53	53	Laborer,	Italy,	New Haven,	July	5, 1894,	Abusing child,	3 years.	
Rice, Ernest,	22	23	Watch maker,	Connecticut,	Hartford,	Mch.	14, 1893,	Embezzlement,	2 years.	
Rinardo, Joseph,	26	26	Laborer,	Italy,	New Haven,	Jan.	9, 1894,	Assault, int. mur.,	10 yrs.	
Ritzer, Francisco,	24	24	Baker,	Italy,	Danbury,	May	10, 1894,	Counterfeit coin,	3 years.	
Riley, James,	19	19	Laborer,	Connecticut,	Hartford,	June	5, 1894,	Statu. burglary,	1 year.	
Robinson, Charles S.	24	26	Florist,	Ireland,	Hartford,	Sept.	14, 1892,	Horse stealing,	7 years.	
Rockwell, Robert,	27	28	Machinist,	R. Island,	Bridgeport,	May	23, 1893,	Horse theft,	2 years.	
Rossi, Grocoma,	19	19	Shoemaker,	Italy,	New Haven,	Jan.	17, 1894,	Manslaughter,	3 years.	
Rohan, Edward,	35	35	Laborer,	Connecticut,	Tolland,	April	20, 1894,	4 counts burglary,	5 years.	
Roper, James,	24	24	Lather,	Connecticut,	Hartford,	June	5, 1894,	Statu. burglary,	1½ yrs.	
Rowe, Samuel W.,	46	47	Carpenter,	Canada,	Danbury,	Oct.	24, 1893,	Arson,	8 years.	
Ross, John,	40	40	Cook,	Mass.,	Hartford,	Sept.	12, 1894,	Horse stealing,	3½ yrs.	Negro.
Ryan, James,	22	25	Peddler,	New York,	Middletown,	April	7, 1891,	Burglary,	7½ yrs.	2 indictments, 5, 2½.
Ryan, William,	27	30	Jeweler,	Mass.,	Middletown,	April	7, 1891,	Burglary,	5 years.	2 inds., 2½, 2½, 2 com.
Ryan, William (2),	28	28	Laborer,	Connecticut,	Bridgeport,	Feb.	22, 1894,	Theft from person,	20 mos.	*alias* W. M. Mahon.
Ryan, William (3),	28	28	R. R. hand,	Connecticut,	Hartford,	Mar.	7, 1894,	Statu. burglary,	2½ yrs.	2d commitment.
Ryams, John,	32	32	Molder,	New York,	Danbury,	May	9, 1894,	Burg., Horse t'ft.,	4 years.	4th commitment.
Schmidt, Rudolph,	21	23	Baker,	Germany,	Hartford,	Mar.	8, 1892,	Burglary,	4 years.	Another complaint on file.
Schmidt, Hammer,	22	23	Laborer,	England,	Bridgeport,	Sept.	13, 1893,	Burning barn,	2 years.	
Sheridan, Michael,	16	18	Laborer,	Connecticut,	Hartford,	Sept.	15, 1892,	Burglary,	5 years.	
Short, Alberto,	45	47	Laborer,	Italy,	New Haven,	Oct.	20, 1892,	Pas. c'terfeit coin,	4 years.	U. S. District court.
Shelton, Mark R.,	25	26	Buffer,	D. C.,	New Haven,	Jan.	3, 1893,	Burglary,	4 years.	Negro.
Shea, Charles,	41	42	Porter,	New York,	N. London,	Sept.	5, 1893,	Statu. burglary,	3 years.	
Simonds, George,	31	31	Laster,	Connecticut,	Danbury,	June	22, 1894,	Burglary,	4 years.	Negro, sen. com. ex. jail sen., May 23, 1894, 2d com'tm't.
Smith, Amos,	31	39	Stone mason,	Connecticut,	Litchfield,	April	14, 1886,	Assault, at. mur.,	18 yrs.	
Smith, Wm. W.,	19	21	Molder,	Connecticut,	Haddam,	Sept.	27, 1892,	Robbery,	7 years.	
Smith, Howard,	24	25	Hostler,	Connecticut,	Hartford,	Mar.	7, 1893,	Statu. burglary,	2 years.	
Smith, Charles (2),	35	36	Cigarmaker,	Connecticut,	Windham,	May	2, 1893,	Horse stealing,	4 years.	2 indictments, 2. 2.
Smith, James F.,	28	28	Laborer,	Connecticut,	New Haven,	April	25, 1894,	Robbery,	4½ yrs.	

ROSTER OF CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894. — *Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Remarks.
Souder, Wm. J.,	26	31	Salesman,	Ohio,	Hartford,	Sept. 28, 1889,	Manslaughter,	7 years.	$1 fine.
Soarer, Emanuel,	40	40	Sailor,	Portugal,	New Haven,	July 5, 1894,	Robbery,	4 years.	
Spooner, Burt,	19	21	Laborer,	New York,	Danbury,	May 11, 1892,	Robbery,	4 years.	
Squires, Andrew,	40	49	Farmer,	Connecticut,	Brooklyn,	April 23, 1885,	Murder, 2d degree,	Life.	
Steere, Dwight F.,	28	42	Butcher,	Mass.,	Norwich,	April 24, 1876,	Murder, 2d degree,	Life.	Sent to Insane Hosp. Nov. 17, '93; ret. pris. Sept. 19, '94.
Stopple, Rudolph,	40	45	Farmer,	Germany,	Bridgeport,	Oct. 18, 1889,	Murder, 2d degree,	Life.	
Strong, William,	19	20	Farmer,	Connecticut,	Litchfield,	May 11, 1893,	Horse stealing,	2½ yrs.	
St. Marie, Arthur,	20	20	Laborer,	Mass.,	Hartford,	June 12, 1894,	Assault, int. kill,	12 yrs.	
Sullivan, Jeremiah,	50	57	Farmer,	Ireland,	Norwich,	Jan. 6, 1887,	Assault, at. mur.,	10 yrs.	
Sullivan, John,	23	24	Laborer,	Ireland,	N. London,	Sept. 13, 1893,	Theft from person,	16 mos.	
Sullivan, James,	21	21	Tinsmith,	Mass.,	New Haven,	July 3, 1894,	Burglary,	5 years.	
Swartz, Felix,	26	27	Watchmaker,	Poland,	Bridgeport,	Sept. 14, 1893,	Theft from person,	22 mos.	
Taylor, James F.,	20	27	Bar-tender,	New York,	New Haven,	July 18, 1887,	Murder, 2d degree,	Life.	
Tartaglia, Antonia,	23	23	Laborer,	Italy,	Waterbury,	Feb. 20, 1894,	Burglary,	7 years.	3 indictments; 2, 2, 3.
Thomas, Norman,	27	30	Sign painter,	New York,	Bridgeport,	Feb. 19, 1891,	Assault, int. mur.,	15 yrs.	Negro.
Thompson, Thomas,	36	37	Farmer,	Connecticut,	Litchfield,	Oct. 19, 1893,	Car. abuse of child,	7 years.	Negro.
Thompson, John,	37	37	Laborer,	New York,	Hartford,	Sept. 12, 1894,	Horse stealing,	3 years.	Negro.
Tick, William,	34	34	Fireman,	Germany,	New Haven,	Jan. 4, 1894,	Theft,	2 years.	
Tinkham, Emma,	21	21	Housekeeper,	Connecticut,	Hartford,	Mch. 15, 1894,	Manslaughter,	2 years.	$1 fine.
Toliver, James,	26	28	Barber,	Mass.,	Hartford,	Dec. 6, 1892,	Statu. burglary,	3 years.	Negro.
Tracy, Frank,	29	29	Shirt cutter,	New York,	Waterbury,	June 19, 1894,	Burglary,	1 year.	
Trowbridge, Fred R.,	21	21	Brakeman,	Connecticut,	Putnam,	Sept. 4, 1894,	Stealing bicycle,	1 year.	
Tyler, John,	35	36	Sailor,	Pa.,	Hartford,	Dec. 6, 1893,	Burg., pers. viol.,	18 yrs.	Negro.
Veitch, Edward,	23	24	Painter,	Connecticut,	Bridgeport,	Sept. 12, 1893,	Robbery,	4 years.	
Vercessi, Petro,	21	22	Candymaker,	Italy,	New Haven,	Sept. 19, 1893,	Pas. c'terfeit mon.,	7 years.	$1 fine, U. S. Court.
Warren, John,	21	56	Farmer,	Connecticut,	Tolland,	Dec. 14, 1859,	Murder, 2d degree,	Life.	
Walker, Edward H.,	22	27	Laborer,	Connecticut,	Bridgeport,	Nov. 6, 1889,	Manslaughter,	10 yrs.	$1 fine.
Wallack, George A.,	22	26	Boatman,	Michigan,	Bridgeport,	Sept. 12, 1890,	Robbery, theft,	12 yrs.	
Wallace, George W.,	25	29	Bookkeeper,	Illinois,	Bridgeport,	Sept. 12, 1890,	Robbery, theft,	12 yrs.	

Waterbury, Chas. E.,	26	28	Farmer,	Connecticut,	Bridgeport,	Mch.	3, 1892,	Kidnapping,	4 years.	
Walton, Edward,	39	41	Farmer,	Virginia,	Danbury,	May	24, 1892,	Manslaughter,	3 years.	Negro.
Ward, Charles,	36	37	Upholsterer,	Mass.,	New Haven,	Oct.	6, 1893,	Burglary,	6 years.	*Alias* John Brennan.
Wah, Ken,	50	50	Laundryman,	China,	New Haven,	Jan.	19, 1894,	Assault int. to kill,	5 years.	
Walcott, William,	23	23	Barber,	Mass.,	Brooklyn,	May	1, 1894,	Burglary,	3 years.	
Webster, Daniel S.,	20	24	Farmer,	Connecticut,	Waterbury,	April	23, 1890,	Assault int. to kill,	8 years.	
Welch, James,	32	33	R. R. hand,	New York,	Hartford,	June	6, 1893,	Theft,	3 years.	
Welch, William, Jr.,	36	37	Blacksmith,	Connecticut,	N. London,	Sept.	8, 1893,	Burning barn,	6 years.	
Welch, Thomas,	26	26	Brass molder,	Ireland,	Hartford,	Mch.	6, 1894,	Statu. burglary,	3½ yrs.	
Whelton, John,	26	28	Laborer,	Wales,	Norwich,	May	4, 1892,	Burglary,	4 years.	
Whaples, Martin,	67	68	Farmer,	Connecticut,	Hartford,	Mch.	7, 1893,	Assault int. to kill,	4 years.	
Whitefield, George,	27	27	Doctor,	West India,	New Haven,	Jan.	30, 1894,	Forgery,	2½ yrs.	
White, Charles E.,	36	36	Laborer,	Connecticut,	New Haven,	July	5, 1894,	Adultery,	1 year.	Negro.
Williams, George W.,	21	27	Farmer,	Connecticut,	Middletown,	Dec.	4, 1888,	Rape,	15 yrs.	Negro.
Willis, Zyp,	45	47	Laborer,	Virginia,	Bridgeport,	Feb.	24, 1892,	Rape,	Life.	Negro; 2d commitment.
Williams, George B.,	40	41	Farmer,	Mass.,	Hartford,	Sept.	12, 1893,	Horse stealing,	3 years.	
Wilcox, Louis H.,	17	17	Farmer,	Connecticut,	N. London,	Jan.	17, 1894,	Carn'l abuse, child.	4 years.	
Winterfield, Wm. A.,	24	24	Laster,	Denmark,	New Haven,	Jan.	4, 1894,	Theft,	2 years.	2d commitment.
Wilroy, Walter,	24	24	Laborer,	Connecticut,	New Haven,	Jan.	5, 1894,	Forgery,	1 year.	
Williams, William,	20	20	Ship'g clerk,	Connecticut,	Bridgeport,	Feb.	21, 1894,	Burglary,	2 years.	
Williams, John,	22	22	Laborer,	Alabama,	Bridgeport,	Sept.	13, 1894,	Burglary,	3 years.	Negro.
Woods, Frank,	21	23	Car'ge painter,	Connecticut,	Hartford,	June	9, 1892,	Theft from person,	3 years.	
Wood, George,	17	18	Mill hand,	Connecticut,	Putnam,	Sept.	6, 1893,	Fel. as'lt, int. to kill	4 years.	
Woods, Henry,	27	28	Cook,	N. Carolina,	Bridgeport,	Sept.	15, 1893,	Assault int. to kill,	1⅜ yrs.	Negro.
Worth, Robert,	52	52	Seaman,	Nova Scotia,	Hartford,	June	5, 1894,	Stat. burn. pri. bldg,	2 years.	
Worden, Herbert,	23	23	Machinist,	Connecticut,	Norwich,	May	10, 1894,	Burglary,	1¼ yrs.	2d committment.
Young, Fred'k H.,	17	25	Carpenter,	Connecticut,	Brooklyn,	April	15, 1886,	Murder, 2d degree,	Life.	
* Cronin, John,	37	37	Farmer,	Connecticut,	Hartford,	Mch.	20, 1894,	Murder, 1st degree,	Death.	Sentenced to be hung Aug. 24, 1894.

* Under sentence of death, and not included in any table.

ROSTER OF CONVICTS DISCHARGED FROM CONNECTICUT STATE PRISON FROM AUG. 1, 1893, TO SEPT. 30, 1894.

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crimes.	Sentence	When discharged.	Good time lost.	Remarks.
Allard, Arthur,	23	25	Farmer,	New Jersey,	Brooklyn,	Sept. 8, 1892,	As'lt, int. rape,	2 years,	May 30, 1894.	....	
Basken, Max,	20	25	.....	Germany,	New Haven,	July 2, 1889,	Burglary,	5 years,	Dec. 3, 1893.	40 dys.	
Barrett, William E.,	48	52	.....	R. Island,	Hartford,	June 5, 1890,	Theft, person,	4 years,	Nov. 16, 1893.	....	
Baraffo, Ernest,	24	27	Plasterer,	Italy,	New Haven,	July 14, 1891,	Rape,	3 years,	Feb. 13, 1894.	....	
Blake, Walter,	22	25	.....	Connecticut,	Litchfield,	Oct. 6, 1891,	Burglary,	2½ years,	Dec. 1, 1893.	....	
Bolger, James,	22	27	R. R. hand,	New York,	Bridgeport,	Mch. 5, 1889,	Burglary,	6 years,	May 3, 1894.	....	
Brandat, David,	23	32	.....	Canada,	New Haven,	Apr. 14, 1885,	As'lt, int. murd.,	10 years,	Nov. 14, 1893.	....	
Brown, Joseph,	26	33	.....	New York,	Bridgeport,	Sept. 22, 1887,	Burglary,	7 years,	Oct. 4, 1893.	....	*alias* George White.
Brenan, Sarah J.,	56	59	....	Connecticut,	Hartford,	Sept. 11, 1891,	Statu. arson,	3 years,	Apr. 13, 1894.	....	
Brewer, Charles,	27	29	Tinner,	Connecticut,	Tolland,	Dec. 6, 1892,	Burglary,	2 years,	Sept. 1, 1894.	....	
Brophy, Thomas,	28	29	Oysterman,	Connecticut,	Bridgeport,	Feb. 23, 1893,	Burglary,	1 year,	Jan. 3, 1894.	....	
Bruss, Albert,	31	23	.....	Germany,	Bridgeport,	May 25, 1893,	Tramp,	4 mos.,	Sept. 25, 1893.	....	
Butts, Charles,	42	47	Hatter,	Iowa,	Bridgeport.	Mch. 5, 1889,	Burglary,	6 years,	May 8, 1894.	5 days.	2 indictments, 3, 3.
Burke, Thomas,	29	32	.....	England,	Hartford,	Dec. 8, 1891,	Statu. burglary,	2 years,	Sept. 4, 1893.	....	
Burke, Edward,	54	56	Blacksmith,	Ireland,	Tolland,	Sept. 5, 1892,	Theft, person,	1½ years,	Dec. 30, 1893.	....	
Casey, Thomas, No. 1,	31	36	R. R. hand,	New York,	Bridgeport,	Mch. 5, 1889,	Burglary,	6 years,	May 26, 1894.	....	2 indictments, 3, 3.
Carter, Henry S.,	24	28	Laborer,	Connecticut,	Hartford,	Dec. 9, 1890,	Robbery,	4 years,	May 21, 1894.	....	
Carroll, James, No. 1,	29	31	.....	Ireland,	Bridgeport,	Feb. 19, 1892,	Horse theft,	2 years,	Nov. 10, 1893.	....	
Cartel, Joseph,	44	46	Wood cutter,	Canada,	Litchfield,	Oct. 13, 1892,	Horse theft,	2 years,	July 4, 1894.	....	

Carpenter, Edward,	33	34	Steam fitter,	Mass'chu'ts,	New London,	Sept. 5, 1893,	Theft,	14 mos.,	Sept. 5, 1894.	....	
Clancy, Thomas,	25	30	.....	Connecticut,	New Haven,	July 12, 1889,	Horse stealing,	5 years,	Oct. 31, 1893.	....	
Clark, William P.,	24	25	Teamster,	Connecticut,	Hartford,	Mch. 10, 1893,	Statu. burglary,	14 mos.,	Mch. 15, 1894.	....	
Clark, John D.,	39	40	Canvasser,	Mass'chu'ts,	New Haven,	Jan. 3, 1893,	Statu. burglary,	2 years,	Sept. 24, 1894.	....	
Connell, John,	23	27	Laborer,	Connecticut,	Danbury,	Oct. 22, 1890,	Theft, person,	4 years,	Apr. 9, 1894.	10 dys.	
Coe, Sidney,	68	70	.....	Connecticut,	New Haven,	Jan. 5, 1892,	Blackmail,	2 years,	Sept. 26, 1893.	....	
Connelly, Michael,	27	28	Lather,	Connecticut,	New Haven,	Apr. 13, 1893,	Statu. burglary,	1½ years,	July 29, 1894.	....	
Cooney, Edward,	23	24	Hostler,	Ireland,	Bridgeport,	Sept. 12, 1893,	Theft,	1 year,	July 23, 1894.	....	
Crowley, Fannie,	25	29	.....	Connecticut,	New Haven,	Jan. 13, 1890,	Arson,	7 years,	Sept. 22, 1893.	...	Pardon'd by Board of Pardons.
Crapp, Michael,	37	41	Cook,	Mass'chu'ts,	Hartford,	June 5, 1890,	Theft, person,	4 years,	Dec. 13, 1893.	....	Sent to Ins'e Asyl. Oct. 3, '90; ret'd to pris. Nov. 28, '92; sent to Asyl. July 15, '93; ret'd to pris. Nov. 17, '93.
Cunningham, Alfred,	40	43	.....	Connecticut,	Litchfield,	Oct. 6, 1891,	Burglary,	2½ years,	Nov. 30, 1893.	....	
Curley, Martin,	21	23	Laborer,	Mass'chu'ts,	Danbury,	May 13, 1892,	Burglary,	2 years,	Feb. 10, 1894.	....	
Cunningham, Thos.,	19	20	Painter,	New Jersey,	Bridgeport,	Feb. 23, 1893,	Burglary,	14 mos.,	Feb. 22, 1894.	....	
Daley, John,	23	25	.....	Connecticut,	Bridgeport,	Sept. 20, 1892,	As'lt, int. to kill,	1 year,	Aug. 1, 1893.	....	
Dailey, James,	27	29	Harness maker,	Pennsylva'ia	New Haven,	Oct. 16, 1892,	Statu. burglary,	2 years,	July 7, 1894.	10 dys.	
Dickinson, George E.,	25	27	Baker,	Colorado,	Danbury,	May 12, 1892,	Burglary,	2 years,	Jan. 31, 1894.	....	
Douglass, Walter H.,	31	33	.....	Connecticut,	New London,	Sept. 27, 1892,	Adultery,	1 year,	Aug. 8, 1893.	....	
Driscoll, Daniel,	31	32	Cutler,	Connecticut,	Bridgeport,	Sept. 12, 1893,	Being a tramp,	6 mos.,	Mch. 12, 1894.	....	
Dann, William G.,	29	34	Silversmith,	New York,	Bridgeport,	Feb. 19, 1889,	Burglary,	6 years,	Apr. 19, 1894.	....	
Edwards, Robin C.,	22	23	Laborer,	Connecticut,	Norwich,	Jan. 3, 1893,	Horse theft,	2 years,	Sept. 24, 1894.	....	
Ellsworth, Charles M.,	38	43	Farmer,	Connecticut,	Middletown,	Apr. 3, 1889,	Manslaughter,	6 years,	June 1, 1894.	....	
Elliott, William,	24	26	Bookkeeper,	England,	Danbury,	Nov. 17, 1892,	Burglary,	1½ years,	Mch. 2, 1894.	....	
Ellerson, Henry,	17	18	Waiter,	No. Carolina,	New Haven,	Dec. 5, 1893,	Theft,	2 years,	Sept. 26, 1894.	....	
Fasakar, John,	20	21	Mill hand,	Hungary,	Bridgeport,	Feb. 23, 1893,	As'lt, int. to kill,	1 year,	Jan. 3, 1894.	....	

ROSTER OF CONVICTS DISCHARGED FROM CONN. STATE PRISON FROM AUG. 1, 1893, TO SEPT. 30, 1894.—*Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence	When discharged.	Good time lost.	Remarks.
Ferguson, John,	36	37	.....	Scotland,	Bridgeport,	May 31, 1893,	Tramp,	4 mos.,	Oct. 1, 1893.	....	
Ferguson, James S.,	34	35	Decorator,	American,	Bridgeport,	Sept. 21, 1893,	Theft,	1 year,	Aug. 1, 1894.	....	
Fleck, Emil,	28	30	Cook,	Switzerland,	Hartford,	Sept. 15, 1892,	Theft,	1½ years,	Dec. 29, 1893.	....	
Friery, James E.,	24	27	....	Connecticut,	Putnam,	Mar. 5, 1891,	Horse stealing,	3 years,	Dec. 5, 1893.	....	
Freeman, Julius,	35	36	Blacksmith,	Connecticut,	Bridgeport,	Feb. 21, 1893,	Theft, person,	1 year,	Jan. 1, 1894.	....	
Gawn, Athanuse,	43	44	Laborer,	Canada,	Haddam,	Sept. 26, 1893,	Tramp,	6 mos.,	Mch. 25, 1894.	....	
Gilbert, William,	29	34	Bartender,	New York,	Bridgeport,	Oct. 29, 1889,	Manslaughter,	5 yrs., $1,	Feb. 20, 1894.	....	
Green, Christian,	58	61	Military,	Denmark,	New Haven,	Oct. 6, 1891,	Horse stealing,	3 years,	May 8, 1894.	....	
Grant, Joseph,	38	39	.....	New York,	Bridgeport,	May 25, 1893,	Tramp,	4 mos.,	Sept. 25, 1893.	....	
Griffin, Michael,	20	21	Molder,	Connecticut,	Bridgeport,	Sept. 13, 1893,	Burglary,	1 year,	July 24, 1894.	....	
Gurssipo, Furnice,	35	36	Laborer,	Italy,	New Haven,	July 5, 1893,	Statu. burglary,	1 year,	May 15, 1894.	....	
Hawpson, John J.,	31	34	.....	Pa.,	Bridgeport,	Sept. 10, 1891,	Bigamy,	2½ years,	Nov. 4, 1893.	....	
Hathaway, Cicero C.,	21	24	Laborer,	Connecticut,	Hartford,	Dec. 8, 1891,	Burglary,	2½ years,	Feb. 2, 1894.	....	Good time lost given back by warden for faithful service and care of sick during grippe epidemic.
Hamilton, Annie,	50	51	.....	Connecticut,	New Haven,	April 4, 1893,	Theft,	1 year,	Feb. 12, 1894.	5 days,	
Hall, Lorenzo,	27	28	Barber,	Connecticut,	New London,	May 10, 1893,	Bigamy,	1 year,	Mch. 20, 1894.	....	
Healy, Thomas,	33	37	Mason,	Connecticut,	New Haven,	July 1, 1890,	Theft, person,	4 years,	Dec. 12, 1893.	....	2d commitment.
Hilliard, Charles E.,	38	40	.....	Pa.,	New Haven,	April 26, 1892,	Forgery,	1½ years,	Aug. 12, 1893.	....	
Hickey, John,	19	20	Laborer,	Mass.,	Bridgeport,	Feb. 21, 1893,	Burg., day sea'n,	1 year,	Jan. 1, 1894.	....	
Houseman, Ransom,	28	33	....	Connecticut,	Norwich,	May 16, 1889,	Robbery,	5 years,	Sept. 16, 1893.	....	

Hogan, Michael,	35	37	.....	Mass.,	Hartford,	March 7, 1892,	Theft,	2 years,	Nov. 26, 1893.	....	3d offense.
Holt, James,	26	28	Comic songster,	Pa.,	Hartford,	Sept. 13, 1892,	Statu. burglary,	2 years,	June 4, 1894.	....	2d commitment.
Hurst, Mary,	21	22	.....	Mass.,	New London,	May 10, 1893,	Bigamy,	1 year,	Mch. 20, 1894.	....	Confined Sept. 3, 1893, at 5 A. M., 8½ pound boy.
Kane, John,	21	23	Brass buffer,	Ireland,	Waterbury,	Nov. 11, 1892,	Theft, person,	15 mos.,	Dec. 17, 1893.	....	
Killian, Patrick,	27	28	Laborer,	Connecticut,	Hartford,	March 8, 1893,	Theft,	1 year,	Jan. 16, 1894.	....	3d offense.
Knox, Charles,	17	18	Hostler,	N. Carolina,	Bridgeport,	Sept. 12, 1893,	Theft,	1 year,	July 23, 1894.	....	
Lawler, James,	43	46	Farmer,	Connecticut,	Hartford,	Dec. 8, 1891,	Theft,	2½ years,	Feb. 2, 1894.	....	3d offense.
Lee, Charles,	22	26	Hostler,	So. Carolina,	Bridgeport,	Mch. 5, 1890,	Manslaughter,	5 yrs., $1,	Aug. 1, 1894.	....	$1 fine paid.
Lewande, Edward,	19	20	Nurse,	Connecticut,	Bridgeport,	Sept. 14, 1893,	Theft, person,	1 year,	July 25, 1894.	....	
Lincoln, James,	23	25	Machinist,	Maryland,	Danbury,	Nov. 17, 1892,	Burglary,	1½ years,	Mch. 2, 1894.	....	
Lindley, David,	51	53	Lather,	Connecticut,	Danbury,	Nov. 17, 1892,	Theft, person,	1½ years,	Mch. 2, 1894.	....	
Little, James,	23	24	Wool sorter,	New York,	New Haven,	Jan. 3, 1893,	Theft,	2 years,	Sept. 24, 1894.	....	
Louzon, Edward,	25	34	.....	Canada,	New Haven,	Jan. 29, 1885,	As'lt, int. rape,	10 years,	Sept. 2, 1893.	....	Delivered to Jos. E. Shaw, district police Mass. on requisit'n papers fr'm Gov. Morris, has done service in Massach's'tts, a professional.
Loveland, George,	29	31	.....	Connecticut,	Hartford,	June 9, 1892,	Theft, person,	1½ years,	Sept. 24, 1893.	....	
May, Henry,	21	26	.....	Mass.,	New Haven,	July 2, 1889,	Burglary,	5 years,	Nov. 13, 1893.	20 dys.,	
Mattox, Thomas,	17	18	Thread twister,	Connecticut,	Windham,	May 2, 1893,	Burglary,	1 year,	Mch. 17, 1894.	....	
Main, Amasa D.,	42	43	Farmer,	American,	New London,	Sept. 19, 1893,	Burglary,	1 year,	July 30, 1894.	....	
Mellville, John,	33	35	Painter,	Scotland,	Hartford,	June 7, 1892,	Statu. burglary,	2 years,	Feb. 26, 1894.	....	
Merriam, William S.,	23	25	Bookkeeper,	Connecticut,	Hartford,	Mch. 7, 1892,	Horse stealing,	2 years,	April 26, 1894.	....	Sentence to take effect from Aug. 5, 1892, owing to former sentence.
Miller, Frank,	19	21	Pump maker,	Mass.,	Bridgeport,	Sept. 13, 1892,	Burglary,	2 years,	June 9, 1894.	....	
Miller, Samuel,	18	19	Laborer,	Pa.,	Bridgeport,	Feb. 24, 1893,	Burglary,	15 mos.,	Mch. 24, 1894.	....	
Morris, George,	28	30	R. R. hand,	Pa.,	Bridgeport,	May 13, 1892,	Theft,	2 years,	Feb. 1, 1894.	....	
Munn, Frank,	25	28	Sailor,	Connecticut,	Norwich,	Jan. 15, 1891,	Robbery,	4 years,	July 3, 1894.	10 dys.,	
Mulverhill, Daniel,	26	28	Buffer,	Connecticut,	Hartford,	Dec. 6, 1892,	Theft, person,	2 years,	Aug. 27, 1894.	....	

ROSTER OF CONVICTS DISCHARGED FROM CONN. STATE PRISON FROM AUG. 1, 1893, TO SEPT. 30, 1894.—*Continued.*

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence	When discharged.	Good time lost.	Remarks.
Murray, Charles T.,	35	36	Loco. engineer,	Mass.,	Bridgeport,	June 2, 1893,	Burglary,	1 year,	April 12, 1894.	....	
Myerburg, Louis,	22	24	.....	Germany,	Bridgeport,	Feb. 16, 1892,	Horse theft,	2 years,	Nov. 7, 1893.	....	Sent to Ins. Hosp. Mch. 2, '91; ret'd to pris. Nov. 17, '93; should have been discharged Oct. 20, '93.
McCormick, Joseph,	17	21	.....	Connecticut,	New Haven,	July 2, 1889,	Burglary,	5 years,	Nov. 17, 1893.	....	
McCann, John,	19	23	.....	Connecticut,	Bridgeport,	Mch. 3, 1892,	Kidnapping,	2 years,	Nov. 22, 1893.	....	
McCarty, John,	21	21	.....	Mass.,	Windham,	May 2, 1893,	Being a tramp,	3 mos.,	Aug. 2, 1893.	....	
McDonald, William,	25	26	.....	Connecticut,	Danbury,	Nov. 17, 1892,	Theft, person,	1 year,	Sept. 28, 1893.	....	
Morton, Frank,	27	28	.....	New York,	Hartford,	Mch. 7, 1892,	Burglary,	2 years,	Nov. 26, 1893.	....	
Nugent, James,	20	20	Hostler,	American,	Bridgeport,	Sept. 13, 1893,	Being a tramp,	3 mos.,	Dec. 13, 1893.	....	
O'Brien, Daniel,	31	32	Hostler,	Connecticut,	Hartford,	Mch. 10, 1893,	Statu. burglary,	14 mos.,	Mch. 10, 1894.	.	
O'Donnell, Michael,	38	43	Polisher,	Ireland,	Bridgeport,	Mch. 5, 1889,	Burglary,	6 years,	May 10, 1894.	7 days.	
Odell, Henry B.,	37	39	C. E.,	New York,	Bridgeport,	Sept. 22, 1892,	Embezzlement,	1½ years,	Jan. 5, 1894.	....	
Parker, John,	32	33	.....	Mass.,	New Haven,	April 4, 1893,	Being a tramp,	1 year,	Feb. 12, 1894.	....	
Perkins, Edward R.,	38	42	Carpenter,	Connecticut,	Norwich,	May 9, 1890,	Theft,	5 years,	Aug. 26, 1894.	....	
Proctor, Henry H.,	32	33	Engraver,	American,	New Haven,	Sept. 23, 1893,	Forgery,	1 year,	Aug. 3, 1894.	....	
Rego, John,	39	41	Grinder,	New York,	Litchfield,	May 12, 1892,	Theft,	2 years,	Jan. 31, 1894.	....	
Roberts, William J.,	24	26	Brass turner,	England,	Danbury,	May 12, 1892,	Burglary,	2 years,	Jan. 31, 1894.	....	
Roundblen, Charles,	18	19	Railroad hand,	Connecticut,	Hartford,	Mch. 15, 1893,	Theft,	1 year,	Feb. 7, 1894.	....	
Ryan, John,	47	49	Shoemaker,	Connecticut,	Hartford,	June 7, 1892,	Statu. burglary,	2 years,	Feb. 26, 1894.	....	
Ryan, John 2d,	36	38	Stone mason,	New York,	New Haven,	Oct. 6, 1892,	Statu. burglary,	2 years,	July 7, 1894.	....	

Savage, Murty,	51	52	.....	Connecticut,	New Haven,	Oct. 12, 1892,	Burglary,	1 year,	Aug. 23, 1893.	....	
Sekatur, Edward,	29	30	.....	R. I.,	Norwich,	May 4, 1892,	Aban. wife, etc.,	1½ years,	Aug. 19, 1893.	....	*Alias* Edw. Skalar.
Smith, Henry,	50	55	Boot treer,	Virginia,	Haddam,	Sept. 25, 1889,	Burglary,	5 years,	Jan. 12, 1894.	....	2 indictments, 2½, 2½.
Smith, Thomas,	27	27	.....	England,	Bridgeport,	May 25, 1893,	Being a tramp,	4 mos.,	Sept. 25, 1893.	....	
Spooner, William H.,	36	39	Ship carpenter,	Mass.,	Middletown,	Apr. 10, 1891,	Robbery,	4 years,	Sept. 16, 1894.	..	
Starr, George,	28	29	Cook,	New York,	Bridgeport,	Feb. 23, 1893,	Forgery,	15 mos.,	Mch. 23, 1894.	....	
Stone, Frank,	22	23	Laborer,	American,	Litchfield,	Oct. 13, 1893,	Burglary,	1 year,	Aug. 23, 1894.	....	
Swenck, Charles,	23	26	Draper,	New York,	Bridgeport,	May 23, 1890,	Robbery,	4 years,	Dec. 21, 1893.	....	
Thompson, Watson,	22	24	Hostler,	Connecticut,	Hartford,	Sept. 16, 1892,	Horse stealing,	2 years,	June 7, 1894.	....	
Trainor, Thomas,	28	30	Stove molder,	New York,	Bridgeport,	Sept. 14, 1892,	Horse stealing,	2 years,	June 5, 1894.	....	
Travers, John S.,	23	25	Brick mason,	Connecticut,	Hartford,	Dec. 6, 1892,	Theft, person,	2 years,	Aug. 27, 1894.	....	
Twiss, George L.,	23	26	Engraver,	Connecticut,	Hartford,	Dec. 9, 1891,	As'lt, int. to rob,	3 years,	July 11, 1894.	....	
Waters, John E.,	25	30	.....	Connecticut.	Brooklyn,	Sept. 4, 1888,	Horse stealing,	6 years,	Nov. 2, 1893.	....	
Wakeman, Samuel,	26	28	Teamster,	Connecticut,	Bridgeport,	Dec. 22, 1892,	Burglary,	1½ years,	April 7, 1894.	...	
Watson, George,	20	21	Painter,	Mass.,	Bridgeport,	Feb. 24, 1893,	Burglary,	21 mos.,	Aug. 25, 1894.	....	
Ward, Daniel F.,	24	25	Tailor,	American,	Bridgeport,	Sept. 15, 1893,	Burglary,	1 year,	July 26, 1894.	....	
Weeks, Henry,	34	38	Farmer,	Connecticut,	Putnam,	Sept. 11, 1890,	Horse stealing,	4 y., 8 m.,	Sept. 12, 1894.	....	2d commitment.
Webster, William,	35	37	Farmer,	Connecticut,	New Haven,	Oct. 12, 1892,	As'lt, int. ravish,	2 years,	July 3, 1894.	....	Shows Negro blood.
White, Frederick A.,	27	29	Farmer,	New Hamp.,	Tolland,	Dec. 6, 1892,	Burglary,	2 years,	Aug. 27, 1894.	....	
Wingrus, Dominick,	32	34	Laborer,	Italy,	Hartford,	Dec. 6, 1892,	As'lt, int. to kill,	1½ years,	Mch. 22, 1894.	....	
Wilson, Mary,	52	53	.....	England,	New Haven,	Jan 3, 1893,	Conspiracy,	1½ years,	Apr. 18, 1894.	....	
Wolinktzky, John,	27	29	Laborer,	Russia,	Hartford,	Sept. 15, 1892,	As'lt, int. to kill,	2 years,	June 11, 1894.	....	
York, John,	24	26	.....	New Jersey,	Bridgeport,	May 15, 1891,	At'pt at robb'y,	2½ years,	Aug. 5, 1893.	....	
Zevinakewicz, And'w	33	34	Miller,	Poland,	New Haven,	June 21, 1893,	Attempt at rape,	1 year,	May 1, 1894.	....	

ROSTER OF CONVICTS THAT HAVE DIED AT CONNECTICUT STATE PRISON FROM AUG. 1, 1893, TO SEPT. 30, 1894.

NAME.	Age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence.	Died.	Death Age.	Cause of Death.
Anderson, Henry,	56	.....	Mass.,	Litchfield,	Oct. 20, 1885,	Theft,	10 years,	Aug. 26, 1893,	65	Catarrhal stimetilus.
Avery, David,	20	Blacksmith,	New York,	Danbury,	May 11, 1892,	Robbery,	4 years,	Aug. 30, 1894,	22	Phthisis pulmunati.
Becker, Jacob,	54	.....	Germany,	Hartford,	June 7, 1893,	Murder, 2d deg.,	Life,	Nov. 24, 1893,	55	Phthisis pulmunati.
Blague, John R.,	25	Sailor,	Connecticut,	Middletown,	Jan. 10, 1893,	Theft,	2 years,	Aug. 22, 1894,	26	Phthisis.
Bonnelly, Edward,	22	.....	Connecticut,	Hartford,	June 8, 1892,	Statu. burglary,	2 years,	Aug. 31, 1893,	24	Acute cerebral meningitis.
Brown, Jacob,	29	Laborer,	Connecticut,	Bridgeport,	Nov. 17, 1887,	Murder, 2d deg.,	Life,	Jan, 2, 1894,	36	La grippe as primary pneumonia, secondary.
Espy, Robert L.,	55	Polisher,	Ireland,	Hartford,	Sept. 6. 1877,	Murder, 2d deg.,	Life,	Jan. 6, 1894,	69	Apoplexy.
Freeman, Edgar,	24	.. ..	Connecticut,	New Haven,	Jan. 17, 1879,	Rape,	Life,	Oct. 9, 1893,	39	Aortive obstruction.
Gerhard, Francis,	54	.....	Germany,	Norwich,	Jan. 10, 1888,	Burglary,	8 years,	Nov. 12, 1893,	60	Valvular disease of heart.
Gartner, Otto,	41	Laborer,	Germany,	Bridgeport,	Sept. 15, 1892,	Burglary,	3 years,	May 24, 1894,	43	Valvular disease of heart.
Jenks, William H.,	61	.....	Connecticut,	Norwich,	Jan. 31, 1893,	Burning Barn,	4½ years,	Oct. 27, 1893,	62	Asthma cardiac dilatation.
Johnson, Martha C.,	58	.....	Connecticut,	Tolland,	Dec. 22, 1888,	Murder, 2d deg.,	Life,	Jan. 9, 1894,	64	Valvular disease of heart.
Johnson, Wm. D., Jr.,	26	.....	Connecticut,	Litchfield,	May 1, 1889,	Rape,	Life,	Sept. 3, 1893,	31	Hemorrhage of the lungs.
Lobdell, William H.,	18	.....	New York,	Bridgeport,	Sept. 15, 1892,	Burglary,	1½ years,	Dec. 15, 1893,	20	Phthisis pulmunati.
McKay, Daniel,	34	Machinist,	Connecticut,	Danbury,	Nov. 17, 1892,	Burglary,	4 years,	Feb. 1, 1894,	36	Valvular disease of heart.
Smith, Charles,	23	Waiter,	Mass.,	New Haven,	Jan. 3, 1893,	Burglary,	3 years,	Aug. 30, 1894,	24	Cardiac failure from typhus malarial fever.
Sutherland, Samuel,	35	Farmer,	New York,	Bridgeport,	Mch. 3, 1892,	Kidnapping,	4 years,	Aug. 28, 1894.	37	Cardiac dilatation of heart.
Swift, Andrew,	20	.....	Ireland,	Litchfield,	April 22, 1891,	Burglary,	3 years,	Oct. 13, 1893,	23	Phthisis pulmomaneture.

ROSTER OF CONVICTS CONFINED IN CONN. HOSPITAL FOR THE INSANE, MIDDLETOWN, CONN., SEPT. 30, 1894.

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence	Asylum.	Remarks.
Allen, William,	36	50	.....	Maine,	Hartford,	Apr. 17, 1880,	Mur., 2d degree,	Life,	Dec. 8, 1886.	2d commitment.
Anderson, Alonzo W.,	20	30	.....	Connecticut,	Hartford,	Dec. 2, 1884,	Mur., 2d degree,	Life,	Apr. 9, 1885.	
Brooks, John R.,	32	34	Manufacturer,	England,	Bridgeport,	Sept. 22, 1892,	Ass'lt, int. mur.,	10 years,	Sept. 13, 1894.	
Cuff, James,	33	67	.....	Ireland,	Brooklyn,	Nov. 22, 1860,	Mur., 2d degree,	Life,	Mch. 23, 1882.	
Cherest, Michael,	20	42	.....	Mass.,	Hartford,	May 11, 1872,	Mur., 2d degree,	Life,	July 15, 1893.	Sent Ins. Hosp. June 23, '86; ret'd pr. Nov. 28, '92; sent again July 15, '93.
Castagnetto, John,	18	28	Laborer,	New York,	New Haven,	Jan. 16, 1884,	Mur., 2d degree,	Life,	Sept. 13, 1894.	Sent Ins. Hosp. Dec. 8, '86; ret'd to pr. Sept. 7, '87; sent June 2, '90; ret'd May 26, '91; sent Sept. 13, '94.
Corsa, George H.,	25	26	Laborer,	American,	Bridgeport,	Sept. 29, 1893,	Burglary,	3 y., 7 m.,	Apr. 13, 1894.	
Doolittle, Walter S.,	39	47	.....	Connecticut,	New Haven,	Oct. 19, 1886,	Mur., 2d degree,	Life,	Mch. 26, 1892.	Sent Ins. Hosp. June 12, '91; ret'd Dec. 19, '91; sent March 26, '92.
Eogeny, Philip,	19	22	.....	Canada,	Litchfield,	Apr. 22, 1891,	Ass'lt, int. rape,	5 years,	July 15, 1893.	
Pavetti, Philip,	38	44	.....	Italy,	Norwich,	May 11, 1888,	Mur., 2d degree,	Life,	July 15, 1893.	Sent Ins. Hosp. Feb. 13, '90; ret'd July 10, '90; sent July 15, '93.
Johnson, Frederick H.,	43	45	Buffer,	Connecticut,	Bridgeport,	Feb. 17, 1892,	Horse theft, bur.,	10 years,	July 15, 1893.	*Alias* Henry Johnson; 2d com.; 2 indict., 6 and 4.
Kelly, William, No. 1,	25	26	Sailor,	England,	Haddam,	Sept. 26, 1893,	Statu. burglary,	1½ years,	Apr. 13, 1894.	
Murphy, John,	26	35	.....	England,	Litchfield,	Apr. 15, 1885,	At'pt to murder,	15 years,	Mch. 2, 1891.	
McNamara, Michael,	45	61	.....	Ireland,	Bridgeport,	Sept. 23, 1878,	Mur., 2d degree,	Life,	Mch. 23, 1882.	
McIntyre, John,	41	43	Stone mason,	New York,	Litchfield,	May 9, 1892,	Ass'lt, int. rape,	6 years,	Sept. 13, 1894.	
O'Donnell, Thomas,	16	18	Porter,	Connecticut,	Hartford,	Sept. 15, 1892,	Burglary,	5 years,	Apr. 13, 1894.	
Parreto, Salvatore,	34	34	Laborer,	France,	New Haven,	Jan. 4, 1894,	Theft,	2 years,	Sept. 13, 1894.	
Perry, Frederick H. S.,	42	48	.....	Georgia,	Norwich,	Jan. 21, 1888,	Mur., 2d degree,	Life,	Apr. 21, 1888.	
Quigley, Thomas,	28	29	.....	Connecticut,	Hartford,	Mch. 8, 1893,	Theft, br'k'g jail,	3½ years,	July 15, 1893.	Sent Ins. Hosp. March 26, '92; ret'd Nov. 28, '92; sent July 15, '93; ret'd Nov. 17, '93; sent April 13, '94.
Romeni, Joseph,	33	37	Hod carrier,	Italy,	Bridgeport,	May 5, 1890,	Ass'lt, int. mur.,	10 years,	Apr. 13, 1894.	
Rose, Manuel,	32	34	Laborer,	Cape Verde,	New London,	Sept. 23, 1892,	Ass'lt, int. kill,	5 years,	May 17, 1894.	
Sperry, Edgar M.,	43	48	.....	Connecticut,	New Haven,	July 11, 1889,	Assault, child,	12 years,	July 15, 1893.	

ROSTER OF LIFE CONVICTS CONFINED IN CONNECTICUT STATE PRISON, SEPTEMBER 30, 1894.

NAME.	Age when committed.	Present age.	Occupation.	Nativity.	Where convicted.	When committed.	Crime.	Sentence	Remarks.
Allen, George,	33	50	Farmer,	Connecticut,	Bridgeport,	Sept. 7, 1877,	Murder, 2d degree,	Life,	
Alexander, Lorena,	44	60	Housewife,	New York,	Bridgeport,	Nov. 8, 1878,	Murder, 2d degree,	"	
Albrecht, Walter,	26	28	Butcher,	Germany,	Hartford,	Sept. 16, 1892,	Rape,	"	
Bassett, Frank,	24	39	Laborer,	Connecticut,	Bridgeport,	Mar. 1, 1879,	Murder, 2d degree,	"	Sent to Insane Hospital July 15, 1893; returned to Prison April 23, 1894.
Bellware, Hazen,	45	49	Laborer,	Canada,	Hartford,	Dec. 19, 1890,	" "	"	
Bishop, Wesley W.,	33	48	Druggist,	Connecticut,	Norwich,	May 20, 1879,	" "	"	
Bradley, George A.,	24	29	Laborer,	Connecticut,	Hartford,	June 5, 1889,	" "	"	
Buckholtz, William,	25	39	Bookkeeper,	Germany,	Bridgeport,	June 1, 1880,	" "	"	
Chamberlain, Henry B.,	22	29	Clerk,	Connecticut,	New Haven,	July 18, 1887,	" "	"	
Cobb, Kate M.,	31	46	Housewife,	Connecticut,	Norwich,	Jan. 17, 1879,	" "	"	
Conant, Frank V.,	34	44	Salesman,	Mass.,	New London,	Oct. 15, 1884,	" "	"	
Coyle, Richard,	58	66	Cloth finisher,	Ireland,	Norwich,	May 4, 1886,	" "	"	
Davis, John H.,	27	42	Laborer,	Mass.,	Hartford,	April 3, 1879,	" "	"	
Daley, Mary,	45	47	Housewife,	Ireland,	Windham,	Jan. 20, 1892,	" "	"	
Dillon, John,	21	23	Laborer,	Ireland,	Hartford,	Sept. 16, 1892,	Rape,	"	
Donovan, Michael,	46	46	Laborer,	Connecticut,	Norwich,	June 5, 1894,	Murder, 2d degree,	"	
Dynes, John,	19	20	Shoemaker,	Connecticut,	Hartford,	Sept. 23, 1893,	" "	"	Returned from Middlet'n Nov. 28, 1892.
Ellis, Jefferson,	34	49	Sailor,	New York,	Haddam,	Dec. 12, 1879,	" "	"	Att. suicide Mar. 23, 1883, sent Ins. Hosp. Nov. 17, 1893; ret. April 23, 1894.
Feeney, Martin,	37	44	Rubber cutter,	Vermont,	Waterbury,	Nov. 1, 1887,	" "	"	Esc. Oct. 26, '68; rec. May 1, '69; sent Ins. Hosp. Sep. 10, '74; ret. Pri. Oct. 17, '74.
Gilbert, Charles E.,	25	54	Printer,	Connecticut,	Hartford,	May 4, 1865,	" "	"	

Gong, Charles,	19	22	Laundryman,	China,	Hartford,	Sept. 9, 1891,	Murder, 2d degree,	Life.	*Alias* Charles Lee Coon and Lee Geon Goon.
Graves, Oscar,	18	39	Carriage painter,	Connecticut,	Hartford,	Sept. 23, 1873,	" "	"	Escaped June 27, 1877; recaptured June 28, 1877.
Hawley, John,	30	56	Laborer,	Connecticut,	Danbury,	Oct. 21, 1868,	Rape,	"	
Hall, Frederick,	32	55	Laborer,	Mass.,	Litchfield,	July 19, 1871,	Murder, commuted,	"	Sentenced to be hung; sentence commuted by General Assembly.
Hanley, James,	26	28	Laborer,	Connecticut,	Litchfield,	May 12, 1892,	Murder, 2d degree,	"	
Hawley, John, 2d,	39	41	Janitor,	Connecticut,	Bridgeport,	Oct. 7, 1892,	" "	"	Recommitted June 9, 1893, for life.
Hotchkiss, Henry S.,	40	47	Musician,	Connecticut,	Hartford,	Mar. 3, 1887,	" "	"	
Kennedy, John P.,	28	37	Cow herder,	Kansas,	New London,	April 2, 1885,	" "	"	
Lynch, Patrick,	38	55	Laborer,	Ireland,	New Haven,	Oct. 26, 1877,	" "	"	
Perkins, Joel W.,	54	77	Carpenter,	Connecticut,	Litchfield,	April 28, 1871,	" "	"	
Rathborn, Charles I.,	36	38	Farmer,	Connecticut,	New London,	Sept. 16, 1892,	" "	"	
Squires, Andrew,	40	49	Farmer,	Connecticut,	Brooklyn,	April 23, 1885,	" "	"	
Steere, Dwight F.,	28	42	Butcher,	Mass.,	Norwich,	April 24, 1876,	" "	"	
Stoffle, Rudolph,	40	45	Farmer,	Germany,	Bridgeport,	Oct. 18, 1889,	" "	"	Sent to Insane Hospital Nov. 17, 1893; returned Sept. 19, 1894.
Taylor, James F.,	20	27	Bartender,	New York,	New Haven,	July 18, 1887,	" "	"	
Warren, John,	21	56	Farmer,	Connecticut,	Tolland,	Dec. 14, 1859,	" "	"	
Willis, Zyp,	45	47	Laborer,	Virginia,	Bridgeport,	Feb. 24, 1892,	Rape,	"	2d commitment.
Young, Frederick K.,	17	25	Carpenter,	Connecticut,	Brooklyn,	April 15, 1886,	Murder, 2d degree,	"	

CLASSIFICATION BY AGE OF CONVICTS IN CONFINEMENT, SEPTEMBER 30, 1894.

Age when Committed.	No.	Age, Sept. 30, 1894.	No.	Age when Committed.	No.	Age, Sept. 30, 1894.	No.
From 16 to 20,	41	From 16 to 20,	24	From 55 to 60,	5	From 55 to 60,	12
20 to 25,	96	20 to 25,	87	60 to 65,	2	60 to 65,	4
25 to 30,	87	25 to 30,	86	65 to 70,	3	65 to 70,	4
30 to 35,	64	30 to 35,	62	70 to 75,	..	70 to 75,	1
35 to 40,	37	35 to 40,	39	75 to 80,	..	75 to 80,	..
40 to 45,	17	40 to 45,	29				
45 to 50,	17	45 to 50,	21				
50 to 55,	12	50 to 55,	12	Total, . .	381	Total, . .	381

CLASSIFICATION BY OCCUPATION.

Occupation.	No.	Occupation.	No.	Occupation.	No.
Laborers, . .	79	Dyers, . . .	2	Jack Spinner, . .	1
Farmers, . .	54	Engravers, . .	2	Jeweler, . .	1
Grooms, . .	11	Lasters, . .	2	Kitchen Hand, .	1
Carpenters, . .	9	Milk Peddlers, .	2	Lithographer, .	1
Painters, . .	9	Peddlers, . .	2	Lawyer, . . .	1
Blacksmiths, . .	8	Steam Fitters, .	2	Lineman, . .	1
Housekeepers, .	8	Shirt Makers, .	2	Lather, . . .	1
Polishers, . .	8	Shipping Clerks, .	2	Marine Fireman, .	1
Sailors, . . .	8	Salesmen, . .	2	Merchant, . .	1
Buffers, . . .	7	Timber Cutters, .	2	Miller, . . .	1
Barbers, . . .	7	Upholsterers, . .	2	Pressman, . .	1
Hatters, . . .	7	Actor, . . .	1	Plumber, . .	1
Shoemakers, . .	7	Bicycle Inspector, .	1	Porter, . . .	1
Cooks, . . .	6	Bottler, . . .	1	Quarryman, . .	1
Firemen, . . .	6	Boatman, . .	1	Reporter, . .	1
Machinists, . .	6	Brass Finisher, .	1	Rubber Cutter, .	1
Railroad Hands, .	6	Bookbinder, . .	1	Riding Master, .	1
Butchers, . .	5	Brass Molder, .	1	Rubber Maker, .	1
Teamsters, . .	5	Cloth Finisher, .	1	Stamping Buckles, .	1
Bakers, . . .	4	Carpet Layer, .	1	Shoe Cutter, . .	1
Molders, . . .	4	Cow Herder, . .	1	Ship Caulker, . .	1
Waiters, . . .	4	Candy Maker, .	1	Sign Painter, . .	1
Book-keepers, . .	3	Druggist, . .	1	Stone Polisher, .	1
Brakemen, . .	3	Drummer, . .	1	Steel Polisher, .	1
Clerks, . . .	3	Die Sinker, . .	1	Stone Mason, . .	1
Cigar Makers, .	3	Doctor, . . .	1	Stenographer, . .	1
Gardeners, . .	3	Errand Boy, . .	1	Tool Maker, . .	1
Laundrymen, . .	3	Electrician, . .	1	Tailor, . . .	1
Masons, . . .	3	Expressman, . .	1	Tinsmith, . .	1
Mill Hands, . .	3	Fruit Dealer, . .	1	Telegraph Operator,	1
Printers, . . .	3	Florist, . . .	1	Wheelwright, . .	1
Watchmakers, . .	3	Grainer, . . .	1		
Box Makers, . .	2	Grinder, . . .	1		
Bartenders, . .	2	Harness Maker, .	1		
Carriage Painters, .	2	Janitor, . . .	1	Total, . . .	381

CLASSIFICATION BY NATIVITY.

Nativity.	No.	Nativity.	No.	Nativity.	No.
Connecticut,	177	Indiana,	1	Nova Scotia,	2
New York,	41	Kansas,	1	Portugal,	2
Massachusetts,	29	Louisiana,	1	Armenia,	1
Pennsylvania,	7	Michigan,	1	Africa,	1
Rhode Island,	6	Mississippi,	1	Cuba,	1
Virginia,	6	New Jersey,	1	Finland,	1
Maine,	4	Ireland,	25	Poland,	1
District of Columbia,	3	Germany,	16	Scotland,	1
Ohio,	3	Italy,	14	Sweden,	1
Illinois,	2	Russia,	6	Switzerland,	1
Maryland,	2	Canada,	5	Wales,	1
North Carolina,	2	England,	3	West Indies,	1
Vermont,	2	China,	2		
Alabama,	1	Denmark,	2		
California,	1	France,	2	Total,	381

Americans, 292. Foreigners, 89.

CLASSIFICATION BY CRIME.

Crime.	No.	Crime.	No.
Burglary,	70	Arson and endangering life,	1
Statutory burglary,	49	Assault,	1
Murder, 2d degree,	33	Bigamy,	1
Horse stealing,	30	Burglary with violence,	1
Theft from person,	23	Burglary, assault with intent to escape from jail, attempt to break jail,	1
Theft,	20	Burglary, theft, and breaking jail,	1
Assault with intent to kill,	17	Cruelty to animals,	1
Manslaughter,	16	Carnal abuse of a female child under 14 years of age,	1
Rape,	16	Embezzlement,	1
Robbery,	10	Having carnal knowledge of a female child under 14 years of age,	1
Arson,	10	Having in possession counterfeit coin with intent of passing,	1
Assault with intent to murder,	8	Incest,	1
Forgery,	8	Kidnapping,	1
Adultery,	7	Murder commuted,	1
Assault with intent to rape,	6	Robbery with violence,	1
Passing counterfeiting money,	5	Statutory arson,	1
Attempt at rape,	4	Statutory arson and burglary,	1
Burning barns,	4	Statutory burglary and statutory arson,	1
Carnally knowing and abusing a female child under 15 years,	3	Stealing a bicycle,	1
Statutory burglary and theft,	3	Statutory burning of private build'g,	1
Assault with intent to kill and burglary,	2	Theft of boat,	1
Abusing a female child under 15 years of age,	2	Theft and burglary,	1
Horse stealing and burglary,	2	Unlawful cohabitation,	1
Highway robbery,	2	Willful injury to electric signals of a railroad company,	1
Placing obstructions on railroad tracks,	2		
Theft of certain goods and chattels to the amount of $29.50,	2		
Theft and robbery,	2		
Assault with intent to murder an infant child,	1	Total,	381

CLASSIFICATION BY SENTENCE.

Sentence.	Fine.	No.	Sentence.	Fine.	No.
1 year,	...	24	6 years, 6 months,	....	1
1 year,	$100	1	7 years,	....	16
1 year, 2 months,	....	2	7 years,	$1	3
1 year, 3 months,	....	4	7 years, 6 months,	....	3
1 year, 4 months,	....	1	8 years,	....	4
1 year, 6 months,	....	22	8 years, 6 months,	....	1
1 year, 7 months,	....	1	9 years,	....	1
1 year, 8 months,	....	2	9 years,	1	1
1 year, 10 months,	....	1	10 years,	....	10
2 years,	....	53	10 years,	1	3
2 years,	1	1	12 years,	....	10
2 years, 3 months,	....	1	13 years,	....	2
2 years, 5 months,	....	1	14 years,	....	2
2 years, 6 months,	....	18	15 years,	....	10
3 years,	....	48	16 years,	....	1
3 years,	100	1	18 years,	....	3
3 years,	10	1	20 years,	....	3
3 years, 6 months,	....	7	25 years,	....	1
4 years,	....	41	35 years,	....	2
4 years,	1	1	Life,	....	38
4 years, 6 months,	....	1			
5 years,	....	26			
6 years,	....	8	Total,		381

NUMBER OF PRISONERS IN CONFINEMENT AUGUST 1, 1893.

Since Received, Deaths, Discharges, etc.

Whole number in confinement, August 1, 1893,		316
Since received by commitment,		217
Since received from Insane Asylum,		5— 538
Discharged by expiration of sentence,	128	
Discharged by pardon,	1	
Transferred to Insane Asylum,	10	
Died,	18— 157	
Leaving in confinement, Sept. 30, 1894,		381

Offenses.

First offense,	346	
Second "	29	
Third "	3	
Fourth "	1	
Fifth "	1	
Eighth "	1— 381	

Color and Sex.

White males,	331	
White females,	7	
Colored males,	42	
Colored females,	1— 381	

COMMITMENT BY COUNTIES.

The 381 prisoners in confinement on September 30, 1894, were received as follows:

From New Haven County,		104	
" Hartford "		91	
" Fairfield "		87	
" New London, "		40	
" Windham "		20	
" Litchfield "		17	
" Middlesex "		14	
" Tolland "		8	381

Of the above number 4 were sentenced by the U. S. District Court.

Highest number of convicts in confinement during the fourteen months from August 1, 1893, to September 30, 1894,	389
Lowest number,	305
Average number,	$351\frac{1}{14}$

THE SENTENCES OF PRISONERS IN CONFINEMENT ON SEPTEMBER 30, 1894, EXPIRE AS FOLLOWS:

In 1894,	34	1904,	5
1895,	124	1905,	3
1896,	67	1906,	1
1897,	37	1907,	2
1898,	24	1909,	1
1899,	11	1910,	1
1900,	10	1911,	1
1901,	11	1914,	2
1902,	7	Life,	38
1903,	2		381

ROSTER OF PRISONERS SENT TO THE INSANE HOSPITAL FROM AUGUST 1, 1893, TO SEPTEMBER 30, 1894.

Stoffle, Rudolph,	Nov. 17, 1893
Nyman, John,	" " "
Eno, Lewis,	" " "
Ellis, Jefferson,	" " "
O'Neil, John,	" " "
Burns, John, No. 1,	April 13, 1894
Corsa, George H.,	" " "
O'Brien, John (escaped from hospital),	" " "
Kelley, William, No. 1,	" " "
O'Donnell, Thomas,	" " "
Romeni, Joseph,	" " "
Rose, Manuel,	May 17, "
Parreto, Salvatore,	Sept. 13, 1894
Brooks, John R.,	" " "

McIntyre, John,	Sept. 13, 1894
Castagnetto, John,	" " "

Sent to Insane Hospital since August 1, 1893, and remaining there, . 9
Remaining in Insane Hospital from commitments previous to August 1, 1893, ... 13

Total number of State convicts at Insane Hospital, Sept. 30, 1894, . 22

ROSTER OF PRISONERS RECEIVED FROM INSANE HOSPITAL FROM AUGUST 1, 1893, TO SEPTEMBER 30, 1894.

Romeni, Joseph,	Nov. 17, 1893
Crapp, Michael,	" " "
Johnson, George,	" " "
Freeman, Alonzo,	" " "
Bassett, Frank,	April 24, 1894
Stoffle, Rudolph,	Sept. 19, "
Nyman, John,	" " "
Eno, Lewis,	" " "
Ellis, Jefferson,	April 24, "
O'Neil, John,	" " "
Burns, John, No. 1,	Sept. 19, "

ASSIGNMENT OF CONVICTS, SEPTEMBER 30, 1894.

*Under contract,	248	Tailors,	3
Runners,	6	Barbers,	1
Tier men,	9	Sick in hospital,	15
Prison kitchen,	17	Nurses,	2
Warden's kitchen,	6	Laundry,	5
Engineers and fireman,	5	Females,	8
Backyard men,	6	Unemployed,	21
Outside gang,	27		
Bookbinder and shoemaker,	2	Total,	381

CONTRACTS.

Name of Contractor.	Class of Manufactures.	Date of Contract.	Time.	No. of Men.	Rate per Day.	Expiration of Contract.
Marcy Brothers & Co.,	Boots and shoes,	Feb. 1, 1892,	5 years,	48	$.50	Feb. 1, 1897.
Marcy Brothers & Co.,	Boots and shoes,	Feb. 1, 1893,	5 years,	46	.50	Feb. 1, 1898.
Marcy Brothers & Co.,	Boots and shoes,	Aug. 1, 1893,	5 years,	49	.50	Aug. 1, 1898.
Marcy Brothers & Co.,	Boots and shoes,	Jan. 1, 1894,	5 years,	44	.50	Jan. 1, 1899.
Holbrook, Glazier & Co.,	Boots and shoes,	Oct. 1, 1893,	5 years,	49	.50	Oct. 1, 1898.
Total No. of men,				236		

* Contracts called for 236 men but 248 were employed.

BIOGRAPHICAL TABLES OF THE 381 CONVICTS CONFINED IN THE CONN. STATE PRISON, SEPT. 30, 1894.

NO. 1. NATIONALITY OF PARENTS.

Number of Prisoners and Percentages.	Americans.		Irish.		Italian.		German.		French.		Scotch.		English		Swiss.		Polish.		Russian.		African.		Finns.		Portuguese.		Danes.		Norwegians.		Jews.		Welch.		Chinese.		Spanish.	
	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Fathers.	Mothers.
381	165	173	116	118	11	11	23	20	19	16	9	7	16	12	1	1	2	2	3	3	4	5	1	1	2	2	3	3	1	1	2	2	1	....	2	2	....	2
Per cent.	43.3	45.4	30.4	30.9	2.8	2.8	6.0	5.2	4.9	4.2	2.3	1.8	4.2	3.1	.26	.26	.52	.52	.78	.78	1.05	1.3	.26	.26	.52	.52	.78	.78	.26	.26	.52	.52	.26	....	.52	.52	....	.52

NO. 2. RELIGIOUS FAITH OF PARENTS.

Number of Prisoners and Percentages.	Baptist.		Catholic.		Episcopal.		Presbyterian.		Protestant.		Methodist.		Congregational.		Evangelist.		Lutheran.		Heathen.		Unitarians.		Jewish.		Advents.	
	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Fathers.	Mothers.	Father.	Mother.	Fathers.	Mothers.	Father.	Mother.
381	23	31	171	169	19	18	9	7	23	19	51	58	38	37	1	1	14	15	26	20	1	1	4	4	1	1
Per cent.	6.0	8.1	44.9	44.3	4.9	4.7	2.3	1.8	6.0	4.9	13.1	15.0	9.9	9.7	.26	.26	3.6	3.9	6.8	5.2	.26	.26	1.05	1.05	.26	.26

NO. 3.—THE PERSONAL HABITS OF PARENTS; WHETHER THEY WERE CONVICTED OF CRIME; THE PERSONAL HABITS AND EDUCATION OF PRISONERS AND WHETHER THEY ARE MARRIED OR SINGLE.

Number of Prisoners and Percentages.	Personal habits of Parents.			Number of Parents who drank.		Number of Parents convicted of crime.		Character of Prisoners' Homes.			Average duration of Prisoner's home life.	Personal Habits of Prisoners.			Number of Prisoners who used:				Number of Prisoners who could read and write before conviction.		Number of Prisoners educated in:						Number who Graduated.	Number Married.	Number Single.
	Good.	Fair.	Bad.	Fathers.	Mothers.	Fathers.	Mothers.	Good	Fair.	Bad.	Years.	Good.	Fair	Bad.	Tobacco.	Alcohol.	Opium.	Gambling.	Read.	Write.	Public School.	High School.	Colleges.	Reform School.	C. S. Prison.	Private School.			
381	256	108	17	99	26	5	2	297	62	22	16.0	109	165	107	314	266	12	92	340	326	262	43	15	7	1	12	30	145	236
Per cent	67.1	28.3	4.4	26.0	6.8	1.3	.52	77.9	16.2	5.7	.....	28.6	43.3	28.0	82.4	69.8	3.1	24.1	89.2	85.5	68.7	11.2	3.9	1.8	.26	3.1	7.8	38.0	62.0

NO. 4.—THE RELIGIOUS FAITH OF PRISONERS; WHETHER THEY BELONG TO ANY FRATERNAL SOCIETIES TO THE MILITARY OR NAVAL SERVICE, OR WHETHER THEY WERE IN JAIL, PRISON, OR ARRESTED BEFORE.

Number of Prisoners and Percentage.	Baptists.	Catholics.	Episcopalians.	Presbyterians.	Protestant.	Methodist.	Evangelists.	Salvation Army.	Congregationalist.	Lutheran.	Heathen.	Jewish.	Number of Prisoners who belong to Fraternal Societies.	Number who were in the Military Service.	Number who were in the Naval Service.	Number in Jail before.	Number in Prison before.	Number arrested before.
381	22	152	19	6	23	55	1	1	43	12	43	4	54	60	20	144	67	200
Per cent.	5.7	39.8	4.9	1.5	6.0	14.4	.26	.26	11.2	3.1	11.2	1.05	14.1	15.7	5.2	37.8	17.5	52.4

NO. 5.—CAUSE OF CRIME.

Number of Prisoners and Percentages.	Drink.	Bad Company.	Destitution.	Suspicion.	Lust.	Ignorance of money.	Desire of Gain.	Anger.	Opium.	Self-defense.	Innocent.	Conspiracy.	No cause Assigned.
381	175	73	28	5	12	2	11	4	1	4	33	2	31
Per cent.	46.8	19.1	7.3	1.3	3.1	.52	2.8	1.05	.26	1.05	8.6	.52	8.1

PRISON RATIONS.

Sunday.	Breakfast,	Baked pork and beans, bread, and coffee.
	Dinner,	Beef soup and bread.
	Supper,	Bread and molasses.
Monday.	Breakfast,	Boiled rice, molasses, bread, and coffee.
	Dinner,	Corned beef, potatoes, and bread; corn, cabbage, and turnips, in their season.
	Supper,	Bread, molasses, and tea.
Tuesday.	Breakfast,	Beef and potato hash, bread, and coffee.
	Dinner,	Bean soup and bread.
	Supper,	Bread or Indian meal pudding, molasses, and tea.
Wednesday.	Breakfast,	Fish and potato hash, bread, and coffee.
	Dinner,	Beef stew and bread.
	Supper,	Bread, molasses, and tea.
Thursday.	Breakfast,	Beef and rice hash, bread, and coffee.
	Dinner,	Corned beef, potatoes, and bread; corn, cabbage, and turnips, in their season.
	Supper,	Bread, molasses, and tea.
Friday.	Breakfast,	Rolled oats, molasses, bread, and coffee.
	Dinner,	Fish chowder, mashed potatoes, and bread, alternating with baked mackerel and salmon.
	Supper,	Bread, molasses, and tea.
Saturday.	Breakfast,	Beef hash, bread, and coffee.
	Dinner,	Bean soup and bread.
	Supper,	Bread, molasses, and tea.
	NOTE:	Milk and sugar furnished for tea and coffee, and occasionally apple-sauce in its season.

Returns of County Commissioners

IN RELATION TO

JAILS, AND THE RECEIPTS AND EXPENSES OF THE SEVERAL COUNTIES,

AND

REPORTS IN RELATION TO LICENSES

IN THE STATE OF

CONNECTICUT,

FOR THE

YEAR ENDING JUNE 30, 1894.

COMPILED BY THE SECRETARY.

HARTFORD:
PRESS OF WATERMAN & WRIGHT.
1894.

State of Connecticut.

SECRETARY'S OFFICE,
HARTFORD, Dec. 22, 1894.

This pamphlet consists of the returns for the year ending June 30, 1894, made to the Secretary by the County Commissioners of the several counties. Everything comprised in the returns is contained herein, arranged in systematic order. The returns concerning jails, with two tables giving a summary of the main features, are followed by the receipts and expenditures of the several counties, and these by the license returns with a summary. This compilation is made and published annually by the Secretary under the authority conferred by sections 1982 and 331 of the General Statutes.

JOHN J. PHELAN,
Secretary.

State of Connecticut.

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JOHN J. PHELAN,
Secretary.

Returns Concerning Jails.

Returns concerning JAILS, for the County of HARTFORD, for the year ending June 30, 1894.

[Certified by George A. Beers, George A. Hayden and Edward W. Dewey, County Commissioners.]

Number in Jail, June 30, 1893,	256	
Committed during the year,	2,111	2,367
Discharged during the year,		2,130
Number remaining in Jail, June 30, 1894,		237

COLOR AND SEX.

White,	Males,	1,910	Females,	174	Total white,	2,084
Colored,	Males,	25	Females,	2	Total colored,	27
		1,935		176		2,111

AGE.

Over 21 years,	Males,	1,784	Females,	153	Total adults,	1,937
Under 21 years,	Males,	151	Females,	23	Total minors,	174
		1,935		176		2,111

NATIVITY, ETC.

Natives of this state,	733
" of other states,	472
" of other countries,	906
" of this state who cannot read or write,	19
" of other states who cannot read or write,	11
" of other countries who cannot read or write,	59
Who have been strictly temperate,	2
" " moderate drinkers,	2,050
" " habitually intemperate,	59
" " married,	630
" " in prison before,	1,150

FOR WHAT CAUSE COMMITTED.

Adultery,	3	Cruelty to animals,	4
Assault,	125	Defrauding,	21
Assault with intent to kill,	7	Drunkenness,	921
Attempt at rape,	1	Embezzlement,	2
Bastardy,	2	Fornication,	4
Breach of the peace,	203	Frequenting house of ill-fame,	9
Burglary,	58	Horse stealing,	3
Civil process,	5	Injury to property,	4
Common drunkards,	13	Keeping house of ill-fame,	9
Common prostitutes,	14	Larceny,	285
Contempt of court,	24	Lewd conduct,	6

Making or passing counterfeit money,	2	Resisting officer,	32
Malicious injury,	1	Stealing from the person,	7
Manslaughter,	2	Taking horse without leave,	7
Murder,	7	Tramps,	5
Neglect of family,	17	Trespassing on railroad property,	91
Obtaining goods on false pretense,	11	Vagrancy,	144
Perjury,	1	Violation of liquor law,	19
Rape,	1	All other offences,	41
Total,			2,111
Average number in confinement during the year,			249

DISCHARGED, ETC.

By writ of habeas corpus,	3	Sent to court and not returned,	154
By bail or recognizance,	38	Sent to state prison,	31
By payment of fine and costs,	365	Executed (sentenced to be),	1
By expiration of sentence,	1,291	By process not specified above,	14
By State's attorney,	28	Died,	6
By county commissioners,	199		
Total,			2,130

Returns concerning JAILS, for the County of NEW HAVEN, for the year ending June 30, 1894.

[Certified by Jno. L. Lindley, Albert B. Dunham and James Reynolds, County Commissioners.]

Number in Jail, June 30, 1893,	262	
Committed during the year,	2,805	3,067
Discharged during the year,		2,791
Number remaining in Jail, June 30, 1894,		276

COLOR AND SEX.

White,	Males, 2,481	Females, 206	Total white,	2,687
Colored,	Males, 102	Females, 16	Total colored,	118
	2,583	222		2,805

AGE.

Over 21 years,	Males, 2,418	Females, 212	Total adults,	2,630
Under 21 years,	Males, 165	Females, 10	Total minors,	175
	2,583	222		2,805

NATIVITY, ETC.

Natives of this state,	888
" of other states,	597
" of other countries,	1,320
" of this state who cannot read or write,	34
" of other states who cannot read or write,	27
" of other countries who cannot read or write,	210

Who have been strictly temperate,	*
" " moderate drinkers,	*
" " habitually intemperate,	*
" " married,	1,099
" " in prison before,	1,561

FOR WHAT CAUSE COMMITTED.

Adultery,	12	Larceny,	176
Assault,	91	Lewd conduct,	61
Assault with intent to kill,	6	Malicious Injury,	4
Attempt at rape,	3	Murder,	3
Bastardy,	2	Neglect of family,	29
Breach of the peace,	359	Obtaining goods on false pretense,	11
Burglary,	48	Perjury,	2
Civil process,	10	Rape,	1
Common drunkards,	22	Resisting officer,	48
Contempt of court,	5	Robbery,	15
Cruelty to animals,	19	Setting fires,	1
Defrauding,	46	Stealing from the person,	6
Drunkenness,	1,544	Taking horse without leave,	3
Embezzlement,	5	Tramps,	4
Forgery,	5	Trespassing on railroad property,	56
Fornication,	2	Vagrancy,	123
Frequenting house of ill-fame,	20	Violation of liquor law,	6
Horse stealing,	2	All other offenses,	25
Injury to property,	17		
Keeping house of ill-fame,	13		
Total,			2,805
Average number in confinement during the year,			$270\frac{5}{12}$

DISCHARGED, ETC.

By writ of habeas corpus,	1	Sent to state prison,	51
By bail or recognizance,	83	Escaped and not retaken,	3
By payment of fine and costs,	489	By process not specified above,	3
By expiration of sentence,	1,646	Died,	1
By state's attorney,	216	Insane asylum,	2
By county commissioners,	136		
Sent to court and not returned,	160		
Total,			2,791

Returns concerning JAILS, for the County of NEW LONDON, for the year ending June 30, 1894.

[Certified by C. McChesney, C. W. Reynolds and J. T. Batty, County Commissioners.]

Number in Jail, June 30, 1893,	88	
Committed during the year,	943	1,031
Discharged during the year,		938
Number remaining in Jail, June 30, 1894,		93

*Not obtainable.

COLOR AND SEX.

White,	Males,	854	Females,	52	Total white,	906
Colored,	Males,	28	Females,	9	Total colored,	37
		882		61		943

AGE.

Over 21 years,	Males,	830	Females,	45	Total adults,	875
Under 21 years,	Males,	52	Females,	16	Total minors,	68
		882		61		943

NATIVITY, ETC.

Natives of this state,	375
" of other states,	227
" of other countries,	341
" of this state who cannot read or write,	20
" of other states who cannot read or write,	23
" of other countries who cannot read or write,	80
Who have been strictly temperate,	17
" " moderate drinkers,	221
" " habitually intemperate,	705
" " married,	285
" " in prison before,	575

FOR WHAT CAUSES COMMITTED.

Adultery,	3	Horse stealing,	5
Assault,	12	Injury to property,	2
Assault with intent to kill,	13	Keeping house of ill-fame,	7
Attempt at rape,	4	Larceny,	81
Bastardy,	3	Lewd conduct,	3
Bigamy,	2	Murder,	8
Breach of the peace,	101	Neglect of family,	1
Burglary,	56	Obtaining goods on false pretense,	5
Civil process,	2	Rape,	5
Common drunkards,	13	Resisting officer,	12
Common prostitutes,	3	Setting fires,	1
Contempt of court,	7	Stealing from the person,	16
Cruelty to animals,	1	Trespassing on railroad property,	2
Defrauding,	9	Vagrancy,	27
Drunkenness,	485	Violation of liquor law,	7
Embezzlement,	1	All other offenses,	28
Forgery,	7		
Frequenting house of ill-fame,	11		
Total,			943
Average number in confinement during the year,			$91\frac{59}{100}$

DISCHARGED, ETC.

By bail or recognizance,	10	Sent to court and not returned,	10
By payment of fine and costs,	204	Sent to state prison,	22
By expiration of sentence,	602	Escaped and not retaken,	2
By state's attorney,	6	By process not specified above,	12
By county commissioners,	11		
Transferred to other jails, for trial,	59		
Total,			938

Returns concerning JAILS, for the County of FAIRFIELD, for the year ending June 30, 1894.

[Certified by Michael J. Houlihan, Daniel M. Rowland and Whitman S. Mead, County Commissioners]

Number in Jail, June 30, 1893,	151	
Committed during the year,	1,963	2,114
Discharged during the year,		1,941
Number remaining in Jail, June 30, 1894,		173

COLOR AND SEX.

White,	Males,	1,559	Females,	214	Total white,	1,773
Colored,	Males,	176	Females,	14	Total colored,	190
		1,735		228		1,963

AGE.

Over 21 years,	Males,	1,568	Females,	220	Total adults,	1,788
Under 21 years,	Males,	167	Females,	8	Total minors,	175
		1,735		228		1,963

NATIVITY, ETC.

Natives of this state,	649
" of other states,	454
" of other countries,	860
" of this state who cannot read or write,	32
" of other states who cannot read or write,	32
" of other countries who cannot read or write,	136
Who have been strictly temperate,	138
" " moderate drinkers,	346
" " habitually intemperate,	1,479
" " married,	363
" " in prison,	1,106

FOR WHAT CAUSE COMMITTED.

Adultery,	12	Injury to property,	20
Assault,	247	Keeping house of ill-fame,	13
Assault with intent to kill,	24	Larceny,	258
Attempt at rape,	3	Lewd conduct,	6
Bigamy,	4	Murder,	2
Breach of the peace,	198	Neglect of family,	18
Burglary,	57	Obtaining goods on false pretense,	8
Civil process,	18	Rape,	2
Common drunkards,	24	Resisting officer,	28
Common prostitutes,	40	Robbery,	16
Contempt of court,	6	Seduction,	4
Cruelty to animals,	10	Setting fires,	12
Defrauding,	14	Stealing from the person,	37
Drunkennesss,	538	Taking horse without leave,	9
Forgery,	12	Tramps,	22
Fornication,	2	Trespassing on railroad property,	22
Frequenting house of ill-fame,	33		
Horse stealing,	4		

Vagrancy,	207	All other offences,	29
Violation of liquor law,	4		
Total,			1,963
Average number in confinement during the year,			*

DISCHARGED, ETC.

By bail or recognizance,	55	Sent to court and not returned,	33
By payment of fine and costs,	332	Sent to state reform school,	2
By expiration of sentence,	1,216	Sent to state prison,	57
By state's attorney,	95	Escaped and not retaken,	1
By county commissioners,	95	By process not specified above,	6
Transferred to other jails, for trial,	46	Died,	3
Total,			1,941

Returns concerning JAILS, for the County of WINDHAM, for the year ending June 30, 1894.

[Certified by E. M. M. Marlor, E. H. Hall, Davis A. Baker, County Commissioners.]

Number in Jail, June 30, 1893,			33
Committed during the year,		423	456
Discharged during the year,			413
Number remaining in Jail, June 30, 1894,			43

COLOR AND SEX.

White,	Males, 401	Females, 8	Total white,		409
Colored,	Males, 14	Females,	Total colored,		14
	415	8			423

AGE.

Over 21 years,	Males, 372	Females, 5	Total adults,		377
Under 21 years,	Males, 43	Females, 3	Total minors,		46
	415	8			423

NATIVITY, ETC.

Natives of this state,	130
" of other states,	137
" of other countries,	150
" of this state who cannot read or write,	2
" of other states who cannot read or write,	0
" of other countries who cannot read or write,	17
Who have been strictly temperate,	6
" " moderate drinkers,	417
" " habitually intemperate,	0
" " married,	140
" " in prison before,	224

*Not given.

FOR WHAT CAUSE COMMITTED.

Adultery,	2	Injury to property,	4
Assault,	18	Larceny,	28
Assault with intent to kill,	2	Neglect of family,	1
Attempt at rape,	2	Obtaining goods on false pretense,	1
Breach of the peace,	29	Rape,	1
Burglary,	13	Resisting officer,	5
Civil process,	2	Robbery,	1
Common drunkards,	1	Stealing from the person,	3
Cruelty to animals,	2	Taking horse without leave,	1
Defrauding,	2	Trespassing on railroad property,	7
Drunkenness,	260	Vagrancy,	20
Embezzlement,	1	Violation of liquor law,	2
Forgery,	1	All other offences,	7
Fornication,	2		
Horse stealing,	3		
House breaking,	2		
Total,			423

Average number in confinement during the year, . . . $57\frac{7}{9}$

DISCHARGED, ETC.

By bail or recognizance,	2	Sent to state reform school,	1
By payment and part payment of fine and costs,	75	Sent to state prison,	10
By expiration of sentence,	301	Escaped and not retaken,	6
By state's attorney,	8	Sent to Middletown,	1
By county commissioners,	1	Died,	1
Sent to court and not returned,	7		
Total,			413

Returns concerning JAILS, for the County of LITCHFIELD, for the year ending June 30, 1894.

[Certified by D. E. Soule, J. K. Judson, C. P. Lyman, County Commissioners.]

Number in Jail, June 30, 1893,	34	
Committed during the year,	228	262
Discharged during the year,		216
Number remaining in Jail, June 30, 1894,		46

COLOR AND SEX.

White,	Males,	204	Females,	11	Total white,	215
Colored,	Males,	12	Females,	1	Total colored,	13
		216		12		228

AGE.

Over 21 years,	Males,	185	Females,	9	Total adults,	194
Under 21 years,	Males,	31	Females,	3	Total minors,	34
		216		12		228

NATIVITY, ETC.

Natives of this state,	101
" of other states,	61
" of other countries,	66
" of this state who cannot read or write,	8
" of other states who cannot read or write,	2

Natives of other countries who cannot read or write,	11
Who have been strictly temperate,	15
" " moderate drinkers,	166
" " habitually intemperate,	51
" " married,	67
" " in prison before,	88

FOR WHAT CAUSE COMMITTED.

Adultery,	2	Frequenting house of ill-fame,	2
Assault,	34	Injury to property,	4
Assault with intent to kill,	1	Keeping house of ill-fame,	2
Attempt at rape,	1	Larceny,	16
Bigamy,	1	Lewd conduct,	1
Breach of the peace,	20	Murder,	1
Burglary,	8	Resisting officer,	5
Civil process,	5	Setting fires,	1
Common prostitutes,	2	Taking horse without leave,	3
Cruelty to animals,	1	Tramps,	3
Defrauding,	12	Trespassing on railroad property,	8
Drunkenness,	82	Vagrancy,	5
Forgery,	3	All other offenses,	3
Fornication,	2		

Total,	228
Average number in confinement during the year,	$37\frac{68}{365}$

DISCHARGED, ETC.

By bail or recognizance,	7	By county commissioners,	1
By payment of fine and costs,	66	Sent to court and not returned,	2
By expiration of sentence,	106	Sent to state prison,	6
By state's attorney,	2	By process not specified above,	26

Total,	216

Returns concerning JAILS, for the County of MIDDLESEX, for the year ending June 30, 1894.

[Certified by John Carroll, Charles A. Elliot, Henry M. Snell, County Commissioners.]

Number in Jail, June 30, 1893,	15	
Committed during the year,	239	254
Discharged during the year,		237
Number remaining in Jail, June 30, 1894,		17

COLOR AND SEX.

White,	Males,	228	Females,	8	Total white,	236
Colored,	Males,	3	Females,	0	Total colored,	3
		231		8		239

AGE.

Over 21 years,	Males,	217	Females,	8	Total adults,	225
Under 21 years,	Males,	14	Females,	0	Total minors,	14
		231		8		239

NATIVITY, ETC.

Natives of this state,	96
" of other states,	28
" of other countries,	115
" of this state who cannot read or write,	4
" of other states who cannot read or write,	2
" of other countries who cannot read or write,	11
Who have been strictly temperate,	7
" " moderate drinkers,	131
" " habitually intemperate,	101
" " married,	65
" " in prison before,	138

FOR WHAT CAUSE COMMITTED.

Assault,	23	Larceny,	2
Bastardy,	2	Obtaining goods on false pretense,	5
Breach of the peace,	12	Rape,	1
Burglary,	5	Robbery,	13
Civil process,	1	Taking horse without leave,	1
Common drunkards,	2	Tramps,	2
Cruelty to animals,	2	Trespassing on railroad property,	4
Defrauding,	2	Vagrancy,	5
Drunkenness,	146	Violation of liquor law,	1
Embezzlement,	1	All other offenses,	4
Horse stealing,	1		
Injury to property,	4		

Total,	239
Average number in confinement during the year,	$25\frac{4}{9}$

DISCHARGED, ETC.

By writ of habeas corpus,	1	By county commissioners,	10
By bail or recognizance,	1	Sent to court and not returned,	10
By payment of fine and costs,	35	Sent to state prison,	3
By expiration of sentence,	173	By process not specified above,	2
By state's attorney,	2		

Total,	237

Returns concerning JAILS, for the County of TOLLAND, for the year ending June 30, 1894.

[Certified by William D. Holman, Adolph Korper and D. C. Talbot, County Commissioners.]

Number in Jail, June 30, 1893,	8	
Committed during the year,	72	80
Discharged during the year,		76
Number remaining in Jail, June 30, 1894,		4

COLOR AND SEX.

White,	Males,	68	Females,	2	Total white,	70
Colored,	Males,	2	Females,	0	Total colored,	2
		70		2		72

AGE.

Over 21 years,	Males,	65	Females,	2	Total adults,	67
Under 21 years,	Males,	5	Females,	0	Total minors,	5
		70		2		72

NATIVITY, ETC.

Natives of this state,	48
" of other states,	0
" of other countries,	24
" of this state who cannot read or write,	1
" of other states who cannot read or write,	0
" of other countries who cannot read or write,	4
Who have been strictly temperate,	4
" " moderate drinkers,	16
" " habitually intemperate,	52
" " married,	18
" " in prison before,	21

FOR WHAT CAUSE COMMITTED.

Assault,	9	Larceny,	6
Attempt at rape,	1	Lewd conduct,	1
Bastardy,	1	Neglect of family,	1
Breach of the peace,	6	Obtaining goods on false pre-	
Common drunkards,	1	tense,	1
Cruelty to animals,	1	Rape,	1
Defrauding,	3	Violation of liquor law,	1
Drunkenness,	36	All other offenses,	3
Total,			72
Average number in confinement during the year,			$8\frac{83}{100}$

DISCHARGED, ETC.

By bail or recognizance,	1	By county commissioners,	9
By payment of fine and costs,	17	Sent to state reform school,	1
By expiration of sentence,	42	Sent to state prison,	4
By state's attorney,	1	Died,	1
Total,			76

COLOR, AGE, SEX, NATIVITY, HABITS.

		Hartford.	New Haven	New London.	Fairfield.	Windham.	Litchfield.	Middlesex.	Tolland.	Total.
MALES.	White,	1 910	2,481	854	1,559	401	204	228	68	7,705
	Colored,	25	102	28	176	14	12	3	2	362
	Adults,	1,784	2,418	830	1,568	372	185	217	65	7,439
	Minors,	151	165	52	167	43	31	14	5	628
	Total Males,	1,935	2.583	882	1,735	415	216	231	70	8,067
FEMALES.	White,	174	206	52	214	8	11	8	2	675
	Colored,	2	16	9	14	0	1	0	0	42
	Adults,	153	212	45	220	5	9	8	2	654
	Minors,	23	10	16	8	3	3	0	0	63
	Total Females,	176	222	61	228	8	12	8	2	717
Total,		2,111	2,805	943	1,963	423	228	239	72	8,784
Natives of this state,		733	888	375	649	130	101	96	48	3,020
Natives of other states,		472	597	227	454	137	61	28	0	1,976
Natives of other countries,		906	1,320	341	860	150	66	115	24	3,782
Total,		2,111	2,805	943	1 963	417	228	239	72	8,778
Strictly temperate,		2	*	17	138	6	15	7	4	189
Moderate drinkers,		2,050	*	221	346	417	166	131	16	3,347
Habitually intemperate,		59	*	705	1,479	0	51	101	52	2,447

*Not obtainable.

SUMMARY OF OFFENSES.

FOR WHAT OFFENSES COMMITTED.	Hartford.	New Haven.	New London.	Fairfield.	Windham.	Litchfield.	Middlesex.	Tolland.	Total.
Abortion,									
Adultery,	3	12	3	12	2	2			34
Assault,	125	91	12	247	18	34	23	9	559
Assault with intent to kill,	7	6	13	24	2	1			53
Attempt at rape,	1	3	4	3	2	1		1	15
Bastardy,	2	2	3				2	1	10
Bigamy,			2	4		1			7
Breach of the peace,	203	359	101	198	29	20	12	6	928
Burglary,	58	48	56	57	13	8	5		245
Civil process,	5	10	2	18	2	5	1		43
Common drunkards,	13	22	13	24	1		2	1	76
Common prostitutes,	14		3	40		2			59
Contempt of court,	24	5	7	6					42
Cruelty to animals,	4	19	1	10	2	1	2	1	40
Defrauding,	21	46	9	14	2	12	2	3	109
Drunkenness,	921	1,544	485	538	260	82	146	36	4,012
Embezzlement,	2	5	1		1		1		10
Forgery,		5	7	12	1	3			28
Fornication,	4	2		2	2	2			12
Frequenting house of ill-fame,	9	20	11	33		2			75
Horse stealing,	3	2	5	4	3		1		18
House breaking,					2				2
Illegal voting,									
Injury to property,	4	17	2	20	4	4	4		55
Keeping house of ill-fame,	9	13	7	13		2			44
Larceny,	285	176	81	258	28	16	2	6	852
Lewd conduct,	6	61	3	6		1		1	78
Making or passing counterfeit money,	2								2
Malicious injury,	1	4							5
Manslaughter,	2								2
Murder,	7	3	8	2		1			21
Neglect of family,	17	29	1	18	1			1	67
Obtaining goods on false pretense,	11	11	5	8	1		5	1	42
Perjury,	1	2							3
Rape	1	1	5	2	1		1	1	12
Resisting officer,	32	48	12	28	5	5			130
Robbery,		15		16	1		13		45
Seduction,				4					4
Setting fires,		1	1	12		1			15
Stealing from the person,	7	6	16	37	3				69
Taking horse without leave,	7	3		9	1	3	1		24
Tramps	5	4		22		3	2		36
Trespassing on railroad property,	91	56	2	22	7	8	4		190
Vagrancy,	144	123	27	207	20	5	5		531
Violation of liquor law,	19	6	7	4	2		1	1	40
All other offenses,	41	25	28	29	7	3	4	3	140
Total,	2,111	2,805	943	1,963	423	228	239	72	8,784

Receipts and Expenses of the Several Counties

FOR THE YEAR ENDING JUNE 30, 1894.

Receipts of the County of HARTFORD, for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners : from the State,		$27,485 82
	from the United States,	257 60
	On civil process,	40 35
	On appeal,	963 45
from earnings of prisoners,		1,275 00
" sales at jail,		75 00
" on adjourned cases, town and city courts,		359 42
" temporary loans,		11,500 00
" licenses, 5 per cent.,		6,459 10
" license transfers,		135 00
" state for county home,		7,452 03
" interest on deposits,		510 64
On hand board of management Temporary Home, July 1, 1893		20 20
Use of telephone at home,		2 50
Hay sold,		19 62
In treasury, July 1, 1893,		8,824 73
Total,		$65,380 46
Key fees,		$1,070 00

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$1,985 63
Adjourned cases, city court,	42 93
Earnings of prisoners,	425 00
Total,	$2,453 56

Expenditures of the County of HARTFORD for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$9,972 47
" clothing,	1,824 13
" bedding,	53 50
" fuel,	2,117 48
" light,	335 51
" medicines,	407 04
" medical attendance,	154 25
" salary of jailer,	1,000 00
" salary of assistants,	4,383 65
" salary of chaplain,	125 00
" building and repair,	1,325 61
" furniture,	41 00
" board of sick prisoners,	1 60
" water and ice,	646 33
" telephone,	88 90

Paid at jail for transportation,	59 91
" stationery and stamps,	88 18
" supplies,	1,381 95
" advertisement for coal at jail,	6 00
" interest on loans,	243 86
" advertisement for jail report,	63 00
" bar library,	300 00
insurance, boiler at court house,	100 00
" boiler at jail,	100 00
at court house for repairs,	7,175 62
" telephone,	135 65
" water and ice,	25 00
" janitor,	1,485 00
" furniture,	710 42
on account of county home, for building and repairs,	12,576 50
" expenses,	9,889 05
salary of county commissioners,	3,671 04
" county treasurer,	325 00
" county auditors,	60 00
stationery, blanks, and stamps,	157 35
incidental office expenses,	146 85
incidental expenses court house,	416 59
" " licenses,	43 05
expense insane prisoners,	47 00
attorney fees,	215 00
loans paid,	2,000 00
report of convictions,	27 50
burial prisoners,	60 00
board of managers of county home,	14 22
Balance treasurer June 30, 1894,	1,380 25
Total,	$65,380 46

INDEBTEDNESS OF THE COUNTY.

Accepted order on county treasurer,	$14,500 00

Receipts of the County of NEW HAVEN for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners : from the state,	$32,652 54
from the United States,	125 76
on civil process,	35 35
on appeal,	1 60
from earnings of prisoners,	3,450 00
" sales at jail,	793 31
" licenses, 5 per cent.,	17,463 80
" " transfers,	400 00
penalty from D. & W. on account of failure to complete W. bridge,	537 50
from town for county home,	765 96
" state for county home,	7,253 68
" interest on East Haven note,	28 88
" law chamber rents,	2,545 00
" rebate on filter bill	2 00
" expense recovering prisoner returned,	26 00
on account of loans,	45,000 00
Balance in treasury June 30, 1893,	20,284 20
Total,	$131,365 58

Expenditures of the County of NEW HAVEN for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$13,792 92
" bedding,	507 62
" fuel,	1,625 28
" light,	568 20
" medicines,	341 91
" medical attendance,	300 00
" salary of jailer,	1,200 00
" salary of assistants,	4,176 00
" salary of chaplain,	125 00
" building and repair,	1,659 49
" water and ice,	594 39
" telephone and telegraph,	111 18
" transportation,	74 25
" stationery and stamps,	74 30
" tobacco,	248 56
" shoes and leather,	382 54
" sundries,	347 58
at court house for repairs,	1,321 27
" telephone,	73 00
" gas, water and ice,	69 44
" janitor,	1,200 00
" engineer,	975 00
" fuel,	297 00
" incidentals,	268 48
" furnishings,	140 54
" court record,	57 50
" electric time,	48 66
on account of county home,	13,289 04
for building and repairs, purchase land,	3,000 00
expenses county reporter,	178 50
rebate to E. E. Sanford,	8 39
salary of county commissioners,	3,537 11
bar library appropriation,	360 00
salary of county auditors,	160 00
insurance,	1,505 60
stationery, blanks, and stamps,	259 36
incidental office expenses,	48 29
attorney fees,	10 00
interest on notes,	750 00
on account Washington bridge,	44,450 00
" Bennet's bridge,	12,000 00
" joint bridge board, expenses, repairs,	2,450 00
extra masonry, engineering, etc.,	4,455 95
Balance to new account,	14,323 23
Total,	$131 365 58

INDEBTEDNESS OF THE COUNTY.

Notes at 5 per cent. interest,	$45 000

Receipts of the County of NEW LONDON for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$10,716 11
from earnings of prisoners,	1,400 00
" licenses, 5 per cent.,	2,799 50
" license transfers,	24 00
" town for county home,	568 36
" state for county home,	2,656 85
" J. A. Brown for county home,	10 00
" Calvin E. Wheeler for county home,	24 00
interest,	191 92
Total,	$18,390 74

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$2,731 13
towns for county home,	104 00
state for county home,	809 13
Total,	$3,644 26

Expenditures of the County of NEW LONDON for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$3,876 56
" clothing,	193 03
" bedding,	41 37
" fuel,	733 32
" light,	30 50
" medicines,	277 61
" medical attendance,	20 00
" salary of jailer,	1,420 00
" salary of assistants,	1,261 00
" building and repair,	745 39
" water and ice,	204 64
" telephone,	167 35
" stationery and stamps,	59 57
" concrete walk,	69 10
" barn expenses,	565 26
" material for labor,	78 53
" shoats,	15 00
" all other expenses,	94 00
Paid at court house for repairs,	143 35
" telephone,	40 00
" water and ice,	40 00
" janitor and messenger,	290 00
on account of county home,	2,916 95
salary of county commissioners,	1,543 63
" treasurer,	180 00
" auditors,	40 00
insurance,	112 00
stationery, blanks and stamps,	116 90
incidental office expenses,	50 00
law library association,	200 00
city of Norwich for court house expenses,	525 27
reporting violations of liquor law,	30 00
organist at Norwich jail,	25 00
Total,	$16,105 33

Receipts of the County of FAIRFIELD for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$33,755 47
on civil process,	10 60
from earnings of prisoners,	1,200 00
" sales at jail,	15 00
" licenses, 5 per cent.,	9,778 75
" license revocations,	95 68
" county tax,	59,048 29
" W. C. Quintard, late treasurer,	54 08
" sale of bonds,	45,000 00
" Platt & Rich for excess of amount on order, $4,702,	20 00
" lease of land,	12 00
" McMannus *vs.* county commissioners,	11 00
" McMannus *vs.* county commissioners,	25 00
Total,	$149,025 87
Key fees,	1,500 00

AMOUNT DUE TO THE COUNTY.

From state for board of prisoners,	$2,947 17

Expenditures of the County of FAIRFIELD for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$8,335 16
" clothing,	1,842 80
" bedding,	374 87
" fuel,	2,214 15
" light,	881 48
" medicines,	333 50
" medical attendance,	35 00
" vaccination,	107 50
" salary of jailer,	1,375 00
" salary of assistants,	3,899 93
" building and repair,	2,879 85
" furniture,	14 00
" board of sick prisoners,	37 78
" water and ice,	878 31
" telephone,	147 20
" transportation,	114 70
" stationery and stamps,	107 61
" firemen and engineers,	768 00
" sundries and supplies,	855 72
" insurance,	91 25
" miscellaneous,	43 00
" stable expenses,	120 64
" workshop,	3,208 00
Paid at court house for repairs,	1,516 37
" telephone,	160 05
" janitor,	1,951 76
" supplies and furniture,	1,115 07
" elevator expenses,	318 00
" insurance,	90 00
on account of county home: for expenses,	1,900 00

Paid salary of county commissioners,		4,676 64
" of county treasurer,		155 00
" of county auditors,		140 00
stationery, blanks and stamps,		383 78
incidental office expenses,		151 31
new Bennett's bridge,		12,000 00
legal expenses,		221 90
common pleas court,		43 90
one-half maintenance of bridges,		2,450 00
law library association,		1,000 00
representative expenses,		172 00
interest,		3,746 32
revocation costs,		115 01
key fees,		1,500 00
new Washington bridge,		48,330 69
judgment fees,		11 00
clerk fees,		77 00
Babbit's bridge, repairs,		137 75
Total,		$111,029 00
Add old orders drawn in 1891,	$15,651 66	
" " " 1893,	17,368 99	
	$33,020 65	
Deduct orders drawn in 1894, not paid,	92 41—	32,928 24
Cash on hand,		5,068 63
Total,		$149,025 87

INDEBTEDNESS OF THE COUNTY.

Bonds at 4 per cent. interest,	$105,000 00
Notes at 5 per cent. interest,	10,000 00
Total,	$115,000 00

Receipts of the County of WINDHAM for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$6,379 23
from earnings of prisoners,	2,614 97
" sales at jail,	301 56
" rent of land,	30 00
" board transients,	30 00
" licenses, 5 per cent.,	990 35
" license transfers,	30 00
" town for county home,	466 05
" state for county home,	3,797 17
" butter sold,	275 46
" pork,	91 07
" outside labor,	17 25
Total,	$15,023 11
Key fees,	$230 50

AMOUNT DUE TO THE COUNTY.

From state for board of prisoners,	$959 21
Earnings of prisoners,	320 06
Total,	$1,279 27

Expenditures of the County of WINDHAM for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$3,139 52
" clothing,	357 46
" bedding,	70 11
" fuel,	110 00
" light,	16 88
" medicines and medical attendance,	49 35
" salary of jailer,	800 00
" salary of assistants,	463 50
" salary of chaplain,	20 00
" building and repair,	180 56
" furniture,	454 74
" telephone,	40 00
" grain,	228 24
" hardware,	163 85
" blacksmithing,	69 41
" commissioners' bill,	170 00
" housework,	168 00
" outside labor,	355 51
" fertilizers,	13 90
" rent of land,	85 00
" all other expenses,	142 75
on account of county home: for building and repairs,	100 91
expenses,	3,914 38
commisssioners' bills, county home,	101 17
salary of county commissioners, license,	230 02
" of county commissioners, account of county,	58 24
" of county treasurer,	40 40
" of county auditors,	15 00
insurance,	4 95
incidental office expenses,	100 00
interest,	602 50
printing,	68 50
record book,	7 90
purchase of land,	350 00
all others,	13 50
Total,	$12,706 25

INDEBTEDNESS OF THE COUNTY.

Notes at 4½ per cent. interest,	$12,000 00

Receipts of the County of LITCHFIELD for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$4,012 07
on civil process,	44 38
from earnings of prisoners,	310 90
" licenses, 5 per cent.,	800 90
" town for county home,	1,271 16
" state for county home,	2,786 49
Total,	$9,225 90

AMOUNT DUE TO THE COUNTY.

From state for board of prisoners,	$953 04
Prisoners' labor,	486 91
Towns for temporary home,	863 04
Total,	$2,302 99

Expenditures of the County of LITCHFIELD for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$2,204 60
" clothing,	112 65
" bedding,	73 16
" fuel,	400 75
" light,	54 00
" medicines,	140 83
" medical attendance,	91 75
" salary of jailer,	716 71
" salary of assistants,	453 94
" building and repair,	601 69
" water and ice,	75 00
" telephone,	36 50
" transportation,	18 51
" stationery and stamps,	6 25
" general supplies,	739 34
at court house for repairs,	87 53
on account of county home,	4,716 26
salary of county commissioners,	589 13
insurance,	150 00
stationery, blanks and stamps,	107 88
rent of office at Litchfield,	12 50
" of office at Winsted,	52 47
" of court room, Falls Village,	100 00
legal expenses,	40 00
library at New Milford,	21 00
janitor,	5 00
supplies, court common pleas,	74 70
Total,	$11,682 15
Less expense county home paid by state and towns,	4,716 26
Net expense,	$6,965 89

Receipts of the County of MIDDLESEX, for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners : from the state,	$3 317 15
from earnings of prisoners,	289 81
" sales at jail,	84 96
" licenses, 5 per cent.,	818 79
" county tax,	5,643 37
" town for county home,	172 30

Received from state for county home,	$3,882 98
" borrowed money,	5,000 00
" building committee of county buildings for bills paid,	254 48
" town of Haddam, painting court house,	60 00
" insurance rebate,	19 47
miscellaneous,	26 20
Total,	$19,569 51
Key fees,	$119, 50

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$377 69
state, for board of children at temporary home,	877 41
town, " " " "	58 64
Total,	$1,313 74

Expenditures of the County of MIDDLESEX, for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$1,709 25
" clothing,	310 65
" bedding,	110 60
" fuel,	386 69
" light,	2 41
" medicines,	9 73
" medical attendance,	96 80
" salary of jailer,	1,291 49
" salary of assistants,	997 48
" salary of chaplain,	25 00
" building and repair,	290 30
" furniture,	19 90
" water and ice,	23 00
" telephone,	121 50
" transportation,	140 72
" stationery and stamps,	8 75
" transfer of prisoners,	535 83
" superintendence of jail,	200 00
" rent for storage,	10 00
" farm expenses,	186 67
" recapture of prisoner,	32 00
at court house for repairs,	256 24
" water and ice,	4 00
on account of county home, for building and repairs,	761 53
" expenses,	4,302 89
salary of county commissioners,	2,142 16
" county treasurer,	200 00
" county auditors,	40 00
insurance,	45 00
stationery, blanks and stamps,	80 17
incidental office expenses,	176 01
rent of offices,	553 00

Paid borrowed money,	$4,500 00
interest,	56 60
on account of new county building,	89 33
fitting up temporary court room,	64 74
miscellaneous,	190 11
Total,	$19,970 55

INDEBTEDNESS OF THE COUNTY.

Notes at 4½ per cent. interest.	$2,000 00

Receipts of the County of TOLLAND, for the year ending June 30, 1894, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$1,023 98
from earnings of prisoners,	40 98
" sales at jail,	10 19
" licenses, 5 per cent.,	755 50
" county tax,	8,578 99
" town for county home,	212 03
" state, " "	3,093 08
" insurance on county house	3,000 00
" loan at 5 per cent.,	1,000 00
" loans at 6 per cent.,	2,000 00
" sales of beef and pork, county home,	75 29
" error, George Arnold & Son,	1 00
Total,	$19,791 04

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$170 36
" " children,	774 31
towns, " " children,	26 00
George F. Kibbe for furniture,	125 00
Total,	$1,095 67

Expenditures of the County of TOLLAND, for the year ending June 30, 1894, with a statement of the indebtedness on that date.

Paid at jail for provisions,	$1,401 88
" clothing,	65 86
" bedding,	96 57
" fuel,	413 42
" medical attendance,	93 25
" salary of jailer,	360 00
" salary of assistants,	856 48
" building and repair,	649 15
" furniture,	292 81
" water and ice,	50 00
" telephone,	37 00
" sundries,	53 39
" contingent expenses,	251 66
at court house for repairs	161 24

Paid fire proof annex complete,	$2,620 51
jailer's residence,	5,687 41
on account of county home, for building and repairs,	187 78
" expenses,	3,449 99
salary of county commissioners,	1,453 08
" county treasurer,	75 00
" county auditors,	40 00
insurance,	102 00
stationery, blanks, and stamps,	84 15
incidental office expenses,	35 00
interest,	401 47
Total,	$18,919 10

INDEBTEDNESS OF THE COUNTY.

Eight notes at 5 per cent. interest,	$8,000 00
Two " 6 " "	2,000 00
Due county commissioners,	93 58
Salary of jailer,	250 00
" treasurer,	75 00
Sundry bills at county home,	260 00
Interest,	205 00
Medical attendance,	140 00
Total,	$11,023 58

REPORTS OF COUNTY COMMISSIONERS.

FOR THE YEAR ENDING JUNE 30, 1894,

IN RELATION TO LICENSES.

TOWNS. HARTFORD CO.	LIQUOR LICENSES.		BEER LICENSES.		DRUGGISTS' LICENSES.		Total Number of Licenses.	Total Amounts Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	No.	Amounts Received.	No.	Amounts Received.	No.	Amounts Received.				
Hartford,	207	$96,203 00	12	$2,525.00	36	$1,800.00	255	$100,528.00	$5,026.40	$95,501 60
Berlin,	..	....	..	....	1	10.00	1	10 00	.50	9.50
Bristol,	16	5,439 00	1	92.00	6	300.00	23	5,831.00	291.55	5,539 45
Canton,	..	....	..	....	3	30.00	3	30.00	1 50	28.50
East Granby,	2	200.00	..	....	..	....	2	200.00	10.00	190.00
East Hartford,	.	...	..	....	3	30.00	3	30.00	1 50	28.50
East Windsor,	8	800.00	..	....	..	....	8	800.00	40 00	760.00
Enfield,	19	6,900.00	3	230.00	4	162.00	26	7 292.00	364.60	6,927.40
Farmington,	9	3,200.00	..	....	3	110.00	12	3,310.00	165 50	3,144.50
Glastonbury,	..	....	..	....	1	10.00	1	10.00	.50	9 50
Granby,	3	300.00	..	....	..	...	3	300.00	15 00	285.00
Manchester,	1	134 00	..	....	6	72.00	7	206.00	10 30	195 70
New Britain,	1	84.00	1	10.00	10	120.00	12	214.00	10.70	203.30
Plainville,	12	1,138.00	..	. ..	2	100 00	14	1,238.00	61.90	1,176.10
Simsbury,	3	300.00	..	....	..	...	3	300.00	15 00	285 00
Southington,	14	5,334.00	5	768.00	3	150.00	22	6,252.00	312.60	5,939.40
Suffield,	5	1,100.00	..	. ..	..	....	5	1,100.00	55 00	1 045.00
West Hartford,	1	34 00	..	....	..	..	1	34 00	1.70	32.30
Wethersfield,	..	....	..	....	2	20.00	2	20.00	1.00	19.00
Windsor,	6	542.00	..	....	1	50.00	7	592.00	29 60	562.40
Windsor Locks,	8	800.00	2	30.00	2	60.00	12	890.00	44.50	845.50
Total,	315	$122,508 00	24	$3,655.00	83	$3,024.00	422	$129,187.00	$6,459.35	$122,727.65

New Haven Co.										
New Haven,	397	$152,595.00	48	$9,275.00	59	$2,826.00	504	$164,696.00	$8,234.80	*140,815.10
Waterbury,	160	61,370.00	22	3,970.00	26	1,260.00	208	66,600.00	3,330 00	63,270.00
Ansonia,	72	16,900.00	8	1,205.00	10	275.00	90	18,380.00	919 00	17,461.00
Beacon Falls,	4	400.00	..	....	..	....	4	400.00	20 00	380.00
Branford,	21	6,790 00	..	....	3	150.00	24	6,940.00	347.00	6,593.00
Cheshire,	2	145.00	..	....	1	50.00	3	195.00	9.75	185.25
Derby	56	12,315.00	7	890.00	11	350.00	74	13,555.00	677.75	12,877.25
Guilford,	..	....	..	....	1	12.00	1	12.00	.60	11.40
Hamden,	7	2,340.00	3	450.00	1	50.00	11	2,840.00	142.00	2,698.00
Madison	..	....	..	....	1	12.00	1	12.00	.60	11 40
Meriden,	88	34,215.00	12	2,230.00	15	674.00	115	37,119.00	1,855.95	35,263.05
Milford,	7	2,405.00	..	....	2	100.00	9	2,505.00	125.25	2,379.75
Naugatuck,	42	16,175.00	..	....	4	200.00	46	16,375.00	818.75	15,556.25
Orange,	21	5,210.00	3	505 00	2	100.00	26	5,815.00	290.75	5,524.25
Oxford,	1	100.00	..	....	..	....	1	100 00	5.00	95.00
Seymour,	12	4,6 0.00	..	....	2	100.00	14	4,700.00	235.00	4,465.00
Southbury,	2	200.00	..	....	..	....	2	200.00	10.00	190.00
Wallingford,	21	8,520.00	1	200.00	3	112.00	25	8,832.00	441.60	8,390 40
Total,	913	$324,280.00	104	$18,725.00	141	$6,271.00	1158	$349,276.00	$17,463.80	$316,166.10
New London Co.										
New London,	77	$20,836.00	2	$196.00	8	$331.00	87	$21,363 00	$1,068.15	$20,294.85
Norwich,	102	28,752.00	1	250 00	14	675 00	117	29,677.00	1,483.85	28,193.15
Bozrah,	1	34.00	..	....	..	....	1	34.00	1.70	32.30
Colchester,	13	1,300.00	1	38.00	1	50.00	15	1,388.00	69.40	1,318.60
Franklin,	2	200.00	..	....	..	....	2	200.00	10.00	190.00
Griswold,	6	1,336.00	..	....	1	50.00	7	1,386.00	69.30	1,316.70
Groton,	..	....	..	....	4	38.00	4	38.00	1.90	36.10
Preston,	6	451.00	2	71.00	..	....	8	522.00	26.10	495.90
Sprague,	11	1,100.00	..	....	..	....	11	1,100.00	55.00	1,045.00
Stonington,	2	184.00	..	....	5	98.00	7	282.00	14.10	267.90
12 transfers.	..	....	..	....	..	....	..	24.00	24.00	....
Total,	220	$54,193.00	6	$555.00	33	$1,242.00	259	$56,014.00	$2,823.50	$53,190.50

* Paid Treasurer of Police Fund, $7,823.05. Paid Treasurer Firemen's Fund, $7,823.05.

TOWNS	LIQUOR LICENSES.		BEER LICENSES.		DRUGGISTS' LICENSES.		Total Number of Licenses.	Total Amounts Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	No.	Amounts Received.	No.	Amounts Received.	No.	Amounts Received.				
FAIRFIELD CO.										
Bridgeport,	320	$108,456.00	8	$1,300.00	31	$1,474.00	359	$111,230.00	$5,561 50	$105,668.50
Danbury,	94	21,060.00	..	....	14	700.00	108	21,760.00	1,088.00	20,672.00
Brookfield,	2	195.00	.	....	..	....	2	195.00	9.75	185.25
Darien,	5	450.00	..	....	..	...	5	450.00	22.50	427.50
Fairfield,	8	2,000.00	..	....	2	100 00	10	2,100.00	105 00	1,995 00
Greenwich,	26	9,457.00	..	....	2	100.00	28	9,557.00	477 85	9,079.15
Huntington,	7	2,712.00	..	....	2	100.00	9	2,812.00	140 60	2,671.40
New Canaan,	4	400.00	1	75.00	2	100.00	7	575.00	28.75	546.25
Newtown,	13	2,750.00	..	. .	1	50.00	14	2,800.00	140.00	2,660.00
Norwalk	63	21,549 00	7	715.00	9	412.00	79	22,676 00	1,133.80	21,542.20
Stamford,	62	20,606.00	3	310.00	7	350.00	72	21,266 00	1,063.30	20,202.70
Stratford,	1	28.00	..	....	..	....	1	28 00	1.40	26 60
Trumbull,	4	376 00	..	....	..	.. .	4	376.00	18.80	357.20
Westport,	10	3,692.00	..	....	1	50.00	11	3,742 00	187.10	3 554.90
Total,	619	$193,731.00	19	$2,400.00	71	$3,436.00	709	$199,567.00	$9,978.35	$189,588.65
LITCHFIELD CO.										
Litchfield,	4	$550.00	3	$350.00	3	$150.00	10	$1,050.00	$52.50	$997.50
Winchester,	8	2,950.00	..	....	6	300.00	14	3,250.00	162 50	3,087.50
New Milford,	6	2,400 00	..	....	2	100.00	8	2,500 00	125 00	2,375.00
Barkhamsted,	1	100.00	..	. ..	1	50.00	2	150.00	7 50	142 50
Canaan,	3	300.00	..	....	..	....	3	300.00	15 00	285.00
Cornwall,	2	190.00	..	....	..	....	2	190.00	9.50	180.50
Kent,	1	100.00	..	...	..	...	1	100.00	5.00	95 00
New Hartford,	3	1,200.00	..	....	1	50.00	4	1,250.00	62.50	1,187.50
Norfolk,	..	...	..	....	1	12.00	1	12.00	.60	11.40
North Canaan,	..	....	..	....	2	24.00	2	24.00	1.20	22.80
Plymouth,	..	....	..	....	2	24.00	2	24.00	1 20	22 80
Salisbury,	..	....	..	....	2	24.00	2	24.00	1.20	22 80
Sharon,	3	270.00	2	400.00	..	...	3	270.00	13.50	256.50
Thomaston,	6	2,200.00	..	....	2	100.00	10	2,700 00	135.00	2 565.00
Torrington,	10	4,000.00	..	....	3	150 00	13	4,150.00	207.50	3,942 50
Woodbury,	..	....	..	....	2	24.00	2	24.00	1.20	22.80
Total,	47	$14,260.00	5	$750.00	27	$1,008.00	79	$16,018.00	$800.90	$15,217.10

WINDHAM CO.										
Windham,	33	$13,000.00	..	....	7	$350 00	40	$13,350.00	$667.50	$12,682.50
Putnam,	..	.. ..	..	....	6	72.00	6	72.00	3.60	68 40
Killingly,	14	5,600.00	1	75 00	6	262.00	21	5,937 00	296.85	5,640.15
Plainfield,	.	. ..	..	....	2	24 00	2	24.00	1.20	22.80
Sterling,	4	400.00	.	....	..	....	4	400.00	20.00	380.00
Thompson,	.	....	..	..	2	24.00	2	24.00	1.20	22.80
Transfers of licenses,	..	. ..	..	....	..	....	..	.....	30.00	.....
Total,	51	$19,000.00	1	75.00	23	$732.00	75	$19,807.00	$1,020.35	$18,816.65
MIDDLESEX CO.										
Middletown,	45	$11,750 00	4	$59.50	10	$437.00	59	$12,246.50	$612.33	$11,634.17
Chatham,	..	....	..	..	1	12 00	1	12.00	.60	11.40
Clinton,	..	....	..	....	1	12.00	1	12.00	.60	11.40
East Haddam,	5	500.00	..	....	..	...	5	500.00	25.00	475.00
Essex,	..	.. ..	..	....	1	12.00	1	12.00	.60	11 40
Old Saybrook,	6	583.33	1	50.00	1	10.00	8	643.33	32.16	611.17
Portland,	11	2,900.00	..	....	1	50.00	12	2,950.00	147.50	2,802 50
Total,	67	$15,733 33	5	$109.50	15	$533.00	87	$16,375.83	$818 79	$15,557.04
TOLLAND CO.										
Ellington,	..	...	1	$20.00	..	....	1	$20 00	$1 00	$19.00
Stafford,	8	3,170.00	1	180.00	3	$150 00	12	3,500 00	175.00	3,325 00
Vernon,	28	10,840.00	3	500.00	5	250.00	36	11,590.00	579.50	11,010.50
Total,	36	$14,010.00	5	$700.00	8	$400.00	49	$15,110.00	$755.50	$14,354.50

SUMMARY

COUNTIES.	LIQUOR LICENSES.		BEER LICENSES.		DRUGGISTS LICENSES.		Total Number of Licenses.	Total Amounts Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	No.	Amounts Received.	No.	Amounts Received.	No.	Amounts Received.				
Hartford,	315	$122,508.00	24	$3,655 00	83	$3,024.00	422	$129,187.00	$6,459.35	$122,727.65
New Haven,	913	324,280.00	104	18,725.00	141	6,271.00	1,158	349,276.00	17,463.80	*316,166 00
New London,	220	54,193.00	6	555.00	33	1,242.00	259	†56,014 00	†2,823.50	53,190.50
Fairfield,	619	193,731.00	19	2,400.00	71	3,436 00	709	199,567.00	9,978.35	189,588.65
Windham,	51	19,000.00	1	75.00	23	732.00	75	19,807 00	1,020 35	‡18,816.65
Litchfield,	47	14,260 00	5	750.00	27	1,008.00	79	16,018.00	800.90	15,217.10
Middlesex,	67	15,733 33	5	109.50	15	533 00	87	16,375.83	818.79	15,557.04
Tolland,	36	14,010.00	5	700.00	8	400.00	49	15,110 00	755.50	14,354.50
Total,	2,268	$757,715.33	169	$26,969 50	401	$16,646.00	2,838	$801,354.83	$40,120.54	$745,618.09

*Paid to Treasurer of Police Fund $7,823.05, Paid Treasurer Firemen Fund $7,823.05. †Transfer of Licenses $24.00. ‡Transfers, $30.00.